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The autonomy of national fiscal policy in a globalised world: the experience in the Scandinavian EU countries Denmark, Finland and Sweden

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1 INTRODUCTION: THE SCANDINAVIAN ANOMALY

Think of a bumblebee. With its overly heavy body and little wings, supposedly it should not be able to fly—but it does.... This is how so-called analysts view the Swedish economy. We 'defy gravity.' We have high taxes and a large public sector, and yet, Sweden reaches new heights. We are still flying, so well that many envy us for it today.

Prime Minister Göran Persson, Opening Address to the Extra Party Congress of the Social Democrat Party in Stockholm on March 10, 2000.

1.1 Research questions

In Germany the discussion about fiscal policy is dominated by one rarely questioned premise: Only the retreat of the state from many to date public tasks and, as a consequence thereof, a reduced ratio of government expenditures and taxes to GDP could ensure the competitiveness in a globalised economy. A look at the Scandinavian countries, however, shows that this premise does not hold necessarily. In fact, those countries have had a substantially higher government expenditure ratio with 58.3% in Denmark, 56.3% in Finland and 63.5% on the average throughout the 1990s than Germany with 48.2% (Afonso, Schuknecht & Tanzi, July 2003), the average economic growth in the Scandinavian countries has been higher since the second half of 1990s, despite the fact that Finland and Sweden suffered from serious economic crises in the first half of the 1990s. This significant macroeconomic resilience of the Nordic EU-countries is rather puzzling for conventional mainstream economics and leads us straightforward to our overall research questions concerning the relation between the government activity rate and the economic performance of nations:

- How was it possible for Scandinavian EU-countries to develop such a strong macroeconomic during the 1990s and take a lead in realising international competitiveness despite their extraordinarily high degree of government activity?

- Does the Scandinavian experience provide evidence for the assumption that even in the era of financial globalisation there is some autonomy of national fiscal policy, at least as an option for every nation to choose its own preferred level of government intervention?

With regard to these research questions we suggest the following hypotheses as a framework for this analysis:

1. For the explanation of the strong macroeconomic resilience of the Nordic EU-countries it is of crucial importance to understand the peculiar confidence-building role of the Scandinavian welfare state and its underlying egalitarian preferences for the formation and the execution of macroeconomic policies even in response to most severe macroeconomic crises.

2. For the explanation of the sustainability of the impressive size and scope of the Nordic welfare state it is central to understand its interdependencies with the rules governing macroeconomic policies: the norms underlying the welfare regime restrict the choice of macroeconomic policies, and, simultaneously, the chosen macroeconomic policies allow to maintain an extensive welfare state and to accomplish its egalitarian objectives. Hence, there is a choice of the preferred level of government activity even in times of financial globalisation.

Our investigation focuses on the EU-part of Scandinavia, because Norway and Iceland are distinct cases of resource abundant countries, which would limit the possibility to transfer the macroeconomic results of the investigation to other countries. The restriction of our inquiry to the Nordic EU-countries, however, allows for some interesting comparisons of the macroeconomic implications of different exchange rate policies, given that Finland is a member of the EMU, while Denmark and Sweden have hesitated to join the euro area.

1.2 Research background

In the 1990s some scholars would use the concept of a “borderless world”, where nation states would loose their influence on the economic and social destiny of the countries encompassed by them. Others talked about the erosion of

the nation state as a consequence of intensifying tax races to the bottom, including an erosion of the welfare state and the room to maneuver especially in national fiscal policy. And did not the severe crisis the Scandinavian countries Denmark and particularly Finland and Sweden suffered from in the early 1990s prove that “big government”, with its extensive forms of welfare states, guaranteed social security and egalitarian income distribution were no longer affordable in a globalised context?

1.2.1 The optimum scope of government activity

In the meantime the evidence seems to be overwhelming that theories, based on such simple hypotheses of the erosion of welfare states due to globalisation have to be rejected: Now “there exists a broad consensus among welfare state researchers that the welfare state has not been retrenched in any fundamental manner”, (Kautto & Kvist, 2002). Furthermore, as the International Monetary Fund, one of the most influential macroeconomic institutions studying the Swedish experience, concluded: “At the most fundamental level, the powerful role given to government in Sweden reflects a strong social consensus whose economic expression tends to provide a stability that is itself supportive for continued growth”, (Thakur, Keen, Horvath & Cerra, 2003).

Preparing the Global Competitiveness Report on behalf of the World Economic Forum (WEF), McArthur and Sachs questioned an important assumption of their own work: „It certainly would not be correct to infer that economic growth would be maximized at zero government expenditures (though our equation has that perverse property)“, (McArthur & Sachs, 2002). Two years later, their successors at the WEF concluded even more generally, that it would be impossible to define an optimum scope of government activity from the point of view of economic growth. Consequently, they replaced the government activity rate as growth inhibiting factor of the WEF growth competitiveness index with a new “government waste index” on the basis of survey data from the WEF executive opinion survey (Blanke, Paua & Sala-i-Martin, 2004). After testing a number of candidate variables, the WEF researchers selected three of them:

- Extent of distortive government subsidies

- Diversion of public funds
- Public trust in the financial honesty of politicians.

This new approach was obviously strongly influenced by the ongoing debate on good governance. The most important result of the survey probably is that the quality of public governance is nowadays a primary factor of growth and development. With the help of a comprehensive world governance indicator the World Bank researcher Daniel Kaufmann showed the extent to which national governance matters: a country that significantly improves key governance dimensions such as the rule of law, corruption, the regulatory regime, and voice and democratic accountability can expect dramatic increases in its per capita income and in other social dimensions in the long run. This is particularly true for developing and transition countries. Kaufmann's findings, however, show no reverse causality or feedback mechanism: higher incomes in themselves are not automatically translated into improved governance. This is an important message for advanced countries: "The fact that there is no automatic virtuous circle means that continuous political resolve and interventions are required to attain good governance", (Kaufmann, 2004).

As a result of the replacement of the government activity rate by the newly created government waste index, the country ranking according to the Growth Competitiveness Index (GCI) of the WEF changed significantly: A comparison of the old results of the GCI 2002, based on hard government expenditure data, with a revised GCI 2002, based on survey data on government wastefulness, revealed a completely new ranking. Especially the three Scandinavian EU-countries made a big jump ahead. Owed to this new approach:

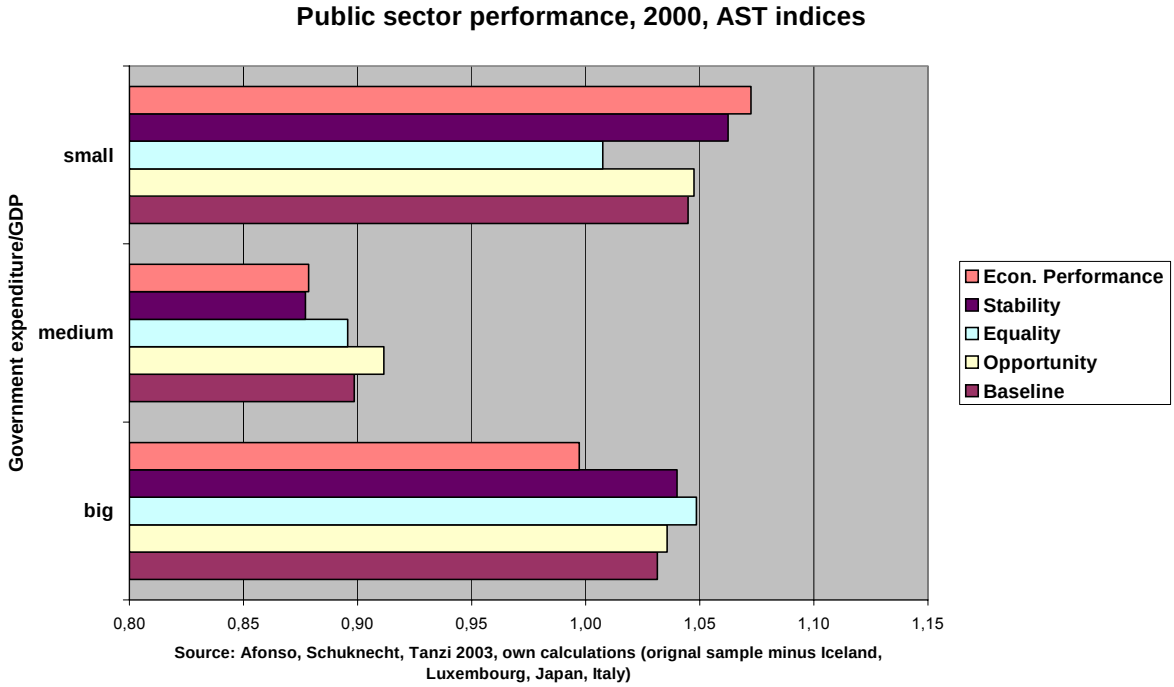
- Denmark jumped uphill from the 10th rank to the 4th rank
- Sweden from the 5th onto the 3rd rank
- Finland from the 2nd to the first rank
- Accordingly, the USA lost its championship in 2002.

Since then, the three Nordic EU-countries defended their top positions in the Global Competitiveness Reports of the WEF. They are still on ranks 2 (Finland),

3 (Sweden), and 4 (Denmark), while the USA fell off even more (World Economic Forum, 2006).

The overall informative value of such country rankings might be highly controversial (Heilemann, Lehmann & Ragnitz, 2006). The methodological shift of the WEF research team indicates a paradigm shift in macroeconomic growth accounting from the use of simple quantitative indicators of government activity to the incorporation of more sophisticated indicators of public sector performance as an explanation of diverging growth performances in international comparisons. So, in another approach to this issue Afonso, Schuhknecht and Tanzi used “opportunity indicators”, such as administrative capability (corruption, red tape, efficient judiciary, size of shadow economy), education participation and performance (secondary school enrolment, education achievement), health indicators as infant mortality and life expectancy, the quality of public communication and transport infrastructure, as well as “Musgravian tasks”, such as income distribution, variation of growth, standard deviations of inflation, per capita income, average growth, and unemployment rates to measure public sector performance (Afonso, Schuknecht & Tanzi, July 2003). Their results differed, as they had expected, according to the size of government activity, but also according to different weights of the overall objectives of government activity and to different country samples. Their original sample included 23 OECD countries which they divided into three groups, according to the share of public spending to overall GDP in the average of the 1990s: small governments < 40% of GDP; big governments > 50% of GDP; medium government 40% >public spending>50% of GDP.

Figure 1-1: Public sector performance, 1990s, AST indices



Using this original data for our own calculations, we excluded four countries from the sample, because they might have distorted the results: Iceland and Luxembourg as very small countries with medium-sized governments, Japan as a special case of a small government with high public-private networks and special social functions of the enterprises otherwise not represented in the sample, and Italy because of its special macroeconomic problems during the 1990s. The results presented in Figure 1-1 are quite surprising: The group of countries with medium-sized governments (Canada, Germany, Greece, New Zealand, Norway, Portugal, United Kingdom) on average showed significantly inferior performance indicators compared to both group with small governments (Australia, Ireland, Switzerland, and the USA) and the group with big governments, including Austria, Belgium, Denmark, Finland, France, the Netherlands, and Sweden. These results are independent of the weighting of the performance indicators:

- baseline (with equal weighting assigned to each of the seven sub-indicators)

- opportunity (2/3 assigned to the opportunity indicators and 1/3 to “Musgravian indicators”)
- equality (1/3 assigned to the distribution indicator and 2/3 to the other indicators)
- stability (1/3 assigned to the stability indicator and 2/3 to the other indicators)
- economic performance (1/3 to the economic performance indicator and 2/3 to the other indicators).

Comparing the groups with small and big governments we find an obviously superior economic performance of the country group with small governments. With most of the other weightings this superiority shrinks significantly, but still persists. There is only one important exception: this is the indicator with a high weighting of equality. Here we find a superior performance of countries with big governments, compared to countries with small shares of government activity and even more significantly compared to countries with medium-sized governments. It is probably no coincidence that the three Nordic EU-countries, Sweden, Denmark, and Finland, belong to this group with comprehensive government activities.

As far as performance is concerned, the overall results falsify the assertion that there is no alternative to a reduction of the government activity rate. In contrast to this obviously wrong claim, we could contend strong evidence for a choice between different varieties of market economies. Depending on their normative preferences, nations could choose between a big government favoring equality and a small government generating somewhat higher economic growth rates. The worst of all worlds seems to be a situation without clear preferences concerning this trade-off between equality and economic performance.

1.2.2 Welfare regimes and varieties of capitalism

It was probably not by chance that around 1990, when the “real existing socialism” ceased to exist, a new strand of research emerged, which could roughly be summarised under the heading of “varieties of capitalism”. The research focus shifted from the comparative analysis of different economic systems to the

comparative studies of particular economies in the framework of the remaining capitalist economic system. The credit for the seminal contribution to this debate has to be given to Gøsta Esping-Andersen, who coined the concept of *welfare regimes* as an expression of his observation that welfare-state variations were not linearly distributed, but clustered by regime types (Esping-Andersen, 1990). According to the norms underlying these types, he distinguished "three worlds of welfare capitalism": the liberal, the conservative-corporatist, and the universalistic, "social democratic" welfare regime, according to the norms underlying them.

Central for the understanding of his theory of welfare regimes are the concepts of mode of solidarity, locus of solidarity, and degree of decommodification.

Table 1-1: Characteristics of welfare regimes

	Liberal	Social democratic	Conservative
Dominant mode of solidarity	Individual	Universal	Kinship Corporatism
Dominant locus of solidarity	Market	State	Family
Degree of de-commodification	Minimal	Maximum	High (for male breadwinner)
Modal examples	USA	Sweden	Germany

Source: adapted from (Esping-Andersen, 2000)

The concept of decommodification reflects the granting of social rights: "If social rights are given the legal and practical status of property rights, if they are inviolable, and if they are granted on the basis of citizenship rather than performance, they will entail a decommodification of status of individuals *vis-à-vis* the market" (Esping-Andersen 1990, 21). The degree of decommodification is obviously derived from the highly normative dominant mode of solidarity: Normative basis for the Anglo-Saxon welfare regime is the liberal work-ethics: "it is one where the limits of welfare equal the marginal propensity to opt for welfare in-

stead of work. Entitlement rules are therefore strict and often associated with stigma; benefits are typically modest", (Esping-Andersen 1990, 26). In contrast, conservative welfare regimes are dominated by the preservation of status differences based on gender, kinship, or corporatist ties. Hence the prominence of the principle of "subsidiarity" in conservative welfare regimes: the state will only interfere when the capacity of the family, i.e. the male breadwinners, or corporatist structures to service its members is exhausted. Last but not least, the universal, "social democratic" welfare regime is based on an egalitarian normative basis and an essentially universal solidarity in favour of the welfare state: "All benefit; all are dependent; and all will presumably feel obliged to pay" (Esping-Andersen 1990, 28).

This seminal contribution was followed by a lively debate in social sciences about the questions of whether there are more than three different clusters of welfare states to be identified: the Antipodes, the Mediterranean, and Japan were suggested as candidates for such additional worlds of welfare capitalism. Esping-Andersen somewhat ironically summarized this debate: "Assuming the validity of all three claims, we will find ourselves with a total of six models for a total of 18-20 nations. The desired explanatory parsimony would be sacrificed, and we might well return to individual comparisons" (Esping-Andersen, 2000, S. 88).

Originally, this debate focused on issues of the welfare state in a narrow sense, i.e. social policy, distribution and labour-market regimes. Macroeconomic implications of different welfare regimes were beyond consideration. This changed somewhat as the *varieties of capitalism* approach entered the stage and shifted the focus of the inquiry from the welfare state to a *relational view of the firm* (Hall, &Soskice, 2001) as key concept of a comparison of different kinds of capitalism. This approach distinguishes between liberal market economies (LMEs) on the one side of a continuum, where economic decisions of companies and other actors are mainly coordinated by competitive markets. On the other side, there are the coordinated market economies (CMEs), where companies depend more strongly on non-market relationships to trade unions, financial intermediar-

ies and other actors, and hence, on strategic interactions with their environment (Hall, &Soskice, 2001), (Hall & Gingerich, 2004).

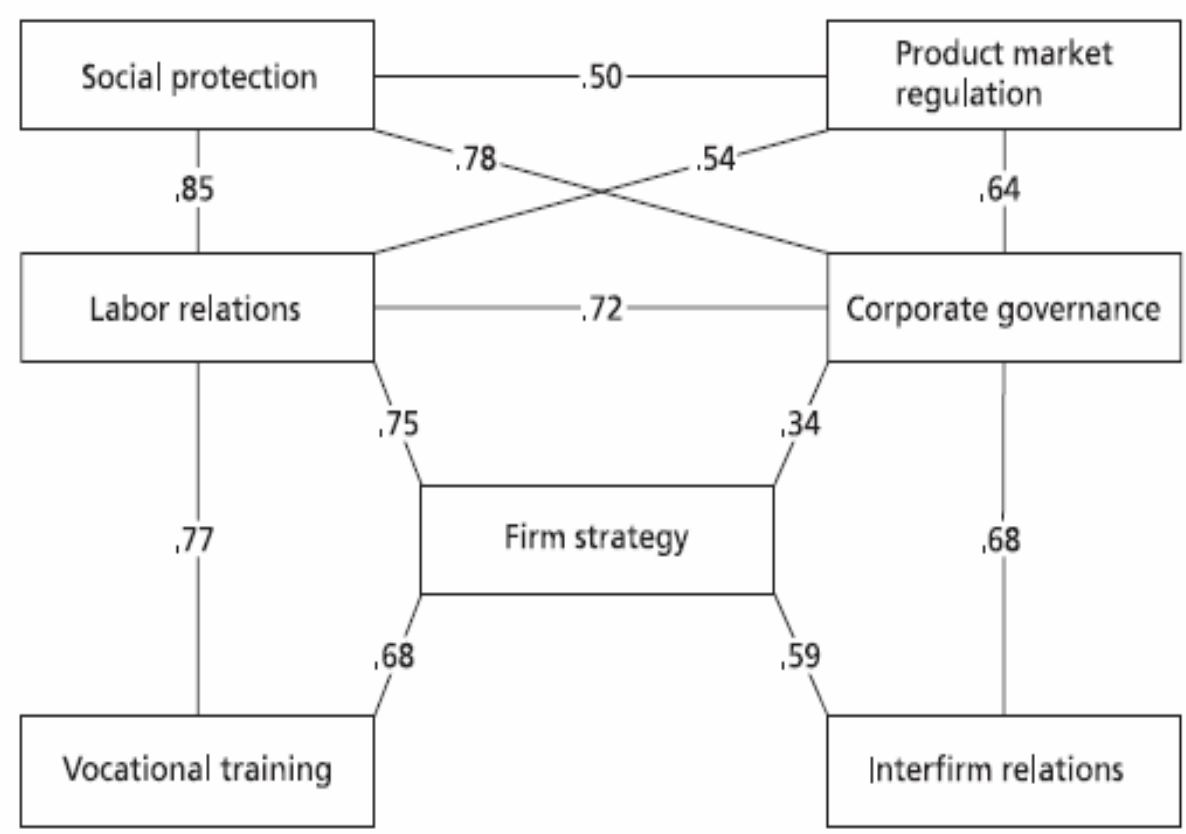
They found the differences between liberal and coordinated market economies reinforced by the presence of *institutional complementarities,* another key concept of their approach: “Here, two institutions can be said to be complementary if the presence (or efficiency) of one increases the returns (or efficiency) of the other", (Hall, &Soskice, 2001, S. 17). The existence of institutional complementarities therefore means that institutions supporting an effective strategic (or competitive) coordination in one sphere of the economy correspond to institutions with analogous strategic (or competitive) modes of coordination in other spheres of the economy. Hence, these institutional complementarities would allow the *consistency* of different modes of coordination even in the framework of private market economies.

Two central hypotheses of the varieties of capitalism approach can be formulated:

- If institutional complementarities exist, it is (a) beneficial for a nation to care for the consistency of the coordination modes used and (b) possible to distinguish between different clusters of LMEs and CMEs.
- Firms vary their own structures and strategies systematically across different nations and clusters of coordination modes with the aim of using the institutional complementarities in their distinguished contexts to the benefit of their own business.

In an attempt to find empirical evidence for the validity of these two hypotheses, Hall and Gingerich calculated correlation coefficients indicating whether the presence of institutional practices of a particular type in one sphere was associated with institutional practices in adjacent spheres. Using cross-national data, they found that companies’ strategies varied systematically relative to the institutional support available for different types of coordination in the four spheres they identified as central for corporate endeavour: labour relations, vocational training, relations between companies, and corporate governance (Figure 1-2) (Hall & Gingerich, 2004).

Figure 1-2: Institutional Complementarities as Context of Companies' Strategies



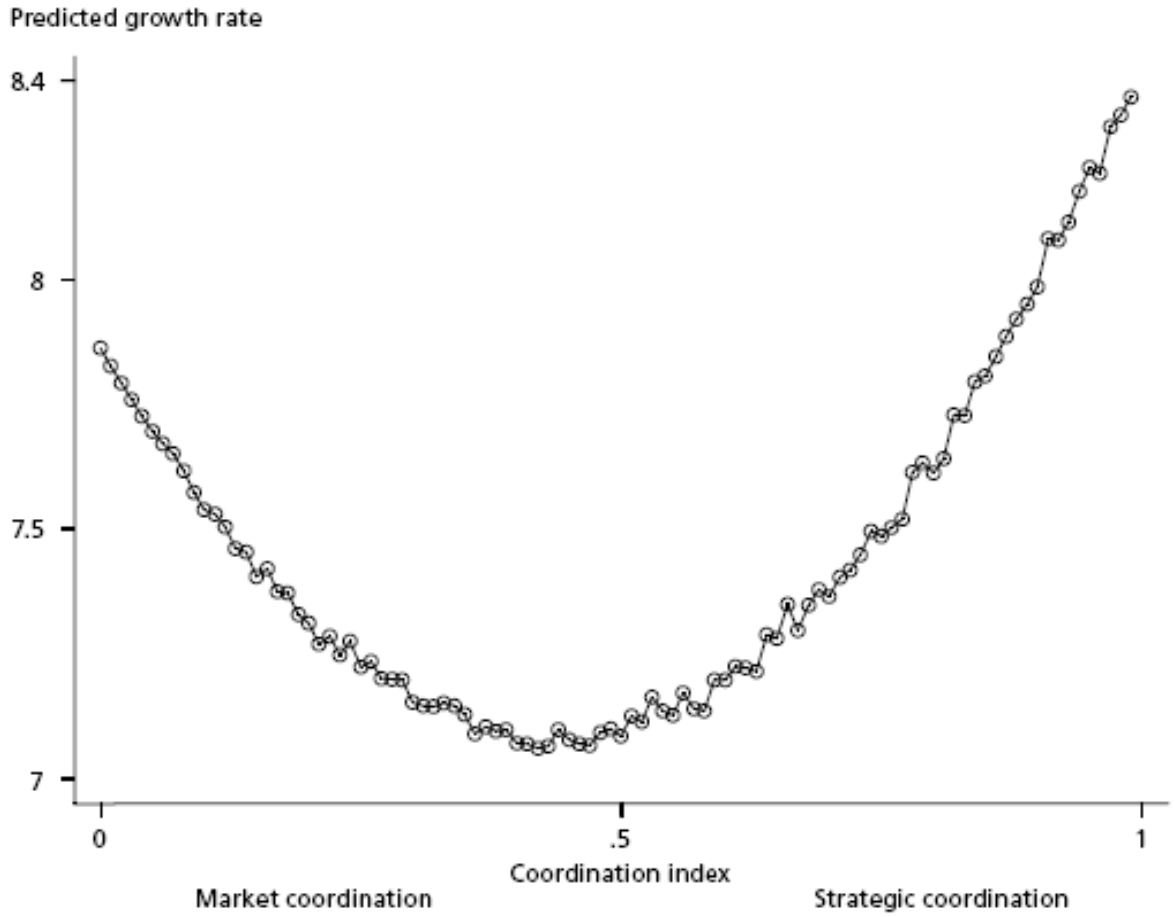
Source: (Hall & Gingerich, 2004)

Building on their result which validated distinguished clusters of LMEs and CMEs, they approached the implications of such varieties for the economic growth performance of nations. They hypothesised that rates of economic growth were to be higher in nations with a consistent mode of coordination (LME or CME), but lower in nations where neither type of coordination is well developed. Using a fixed-effects model, they found a U-shaped relationship between coordination and growth, which confirmed their hypothesis (Figure 1-3).

Interestingly, this U-shaped form of superior growth projections according to the consistency of coordination modes in clusters of LMEs and CMEs coincides with our findings concerning the influence of government size on public sector performance. This might be more than a mere coincidence, since small government activity could be attributed to LMEs and big government to CMEs.

Once more, the intermediate world, here in the sense of a world with hybrid, and probably inconsistent coordination forms, would be the worst of all worlds.

Figure 1-3: Estimated Relationship between Coordination and Economic Growth



Source: (Hall & Gingerich, 2004)

It would, however, be entirely misleading to conclude from this U-shaped relationship between coordination and economic growth that it predicts the best growth performance either for completely anarchic market economies without any institutionalised coordination mechanism or for completely centralised planned economies without any market interactions. Every interpretation of the U-shape has to acknowledge that the research focus is on varieties of modern advanced market economies, i.e. economies within an institutional setting consisting of private property rights, rule of law, public finance and monetary policy, and that the data is drawn from a sample of OECD countries.

1.2.3 Macroeconomic regimes and market constellations

The research results sketched above defined the role of norms and institutional complementarities for the persistence of diverging clusters of welfare regimes and varieties of capitalism. Their macroeconomic implications, though, have been explored only partially, as issues of long-term growth, for instance.

The Latin-French originated word *regime* means the method or system of government or administration, or simply the set of rules for doing something (for example for diet, exercise, etc). As *methodos* it means the way *to* something, for example to reach a certain place or aim. In contrast to that, the term *policy* has to be understood as a statement of ideals and aims (sometimes embracing a certain plan of action as well). So, the concept *regime* is defined here as a *set of rules* aimed at certain objectives given by policy.

As such a set of rules the term regime has found its way into economics as well. Here, it occurs in its first usage as *exchange rate regime*, for instance, referring to the set of rules defining how economies manage the external value of their currencies. Most influential in macroeconomics was the introduction of the concept of *monetary regimes* by Robert Lucas in 1976. His eloquent critique of the macroeconometric models of the 1960s predicting too little inflation in the 1970s suggests that the parameters of traditional term structure equations relating long to short interest rates do not remain stable across regimes, as older models (such as Modigliani and Sutch 1966) had assumed. He argued that the decision rules describing the behaviour of private agents vary with the rules describing monetary policy, according to his premise of rational expectations governing the behaviour of private agents.

A very helpful explication of what this concept of monetary regimes implies can be found in Leijonhufvud (1983):

> *A monetary regime is, first, a system of expectations governing the behavior of the public. Second, it is a consistent pattern of behavior on the part of the monetary authorities such as will sustain these expectations. The short-run response to policy actions will depend on the expectations of the public, which is to say, on the regime that is generally believed to be in effect. Since*

> *the predicted consequences of the same action may differ between regimes, we need a different macro model for each regime. […] The expectations of the public and the actual behavior of the authorities mesh in equilibrium; when they do not mesh, it does not make sense to speak of a regime. (*Our emphasis, Leijonhufvud, 1983, S. 208)

In more general terms, we could define a *macroeconomic regime* as a consistent set of rules in a distinct field of macroeconomic policy interlocking the expectations governing the behaviour of the public with a pattern of behaviour on the part of the government. It becomes immediately clear that this concept is entirely at odds with a naïve understanding of a hierarchical macroeconomic control by monetary or fiscal authorities using simple impulse-response schemes without caring for their feedback with the expectations of the public. In contrast to this naïve view, the concept of macroeconomic regimes is in accordance with the idea of a "market participation theory of economic policy" as opposed to the traditional "market failure theory of economic policy" (Riese, 1988), (Riese, 1998). From the point of view this kind of theory

> *… economic policy towards establishing full employment is not solely a functional device of "market repair" but must be established by a political will (normative target) and can only be pursued by way of participating in the market process. Therefore, the political actor(s) is not a subject external to the market participants (objects) but a market participant (object) himself who is constrained by market forces just like any other market participant. Governmental (and other corporatist actors') interventions will have measurable impacts on quantities and prices, but as any other market participant, the political (or corporatist) actor has finally to accept the market outcome, i.e. cannot ex ante discriminate between warranted quantity and unwarranted price effects.* (Heise, 2006, S. 2)

In such a non-hierarchical context, *macroeconomic regimes* could be functional in the sense that they reduce the magnitude of contingency of policy outcomes by introducing a consistent set of rules and, thus, significantly reducing the uncertainty about future outcomes of macroeconomic policy by meshing the ex-

pectations of the public with the behaviour of the government. If the government does not succeed in establishing consistent sets of rules for its macroeconomic policy, this situation might be termed a *dysfunctional* macroeconomic regime, and characterised by a high degree of uncertainty for all market participants.

1.2.4 The role of norms for the consistency of macroeconomic regimes

In his 2007 presidential address to the annual assembly of the American Economic Association George Akerlof criticised the missing motivation of preferences in the world of New Classical economic theory, leading mistakenly to the five neutralities of modern macroeconomics (Akerlof, November 15, 2006). From his point of view, these preferences are wrongly motivated, because New Classical economics ignores the role of norms for macroeconomically relevant decisions and, therefore, could not model macroeconomic behaviour convincingly without assuming the presence of frictions. Thus, introducing the motivation into the preferences of economic agents would make the assumption of frictions an unnecessary detour for the relevant modelling of macroeconomic behaviour and, even more fundamentally, would falsify the five neutrality results of New Classical macroeconomics.

His approach is characterised by the introduction of norms into the utility functions of macroeconomically relevant decision makers. Introducing norms into such utility functions would fundamentally jeopardise the five neutrality results of the New Classical macroeconomics, which depend on real outcomes only. Norms are opinions of people as to how they *should*, or how they *should not*, behave, as well as views regarding how others *should*, or *should not* behave: “The role of norms can be easily represented in peoples’ preferences by modifying the utility function to include losses in utility insofar, as they or others, fail to live up to their standards”, (Akerlof 2006, 8f).

Discussing the five neutrality results of modern macroeconomics he concludes:

- *Ricardian Equivalence will fail, if the parent has utility from gift-giving*. Considering that the giving of gifts, such as parent-to-child bequest are eco-

nomic transactions highly governed by norms, in this case by norms of family life, and that the "warm glow" from giving enters the utility function of the parents as separate term he concludes: "With a social security transfer more money is hers, and the same consumption allocation to herself entails a gift to her child. With declining marginal utility for bequest-giving, she will then divide an increased social security transfer between additional consumption for herself and an additional bequest to her child" (Akerlof 2006, 17).

- *The consumption-income neutrality of the permanent income hypothesis will fail*, if norms are determining consumption and these norms could be viewed as entitlements or as obligations. Then, in turn, current income would be one of the major determinants of these entitlements, and obligations, and hence, consumption would be dependent on current income, as Keynes assumed.
- The Modigliani-Miller theorem, claiming an independence of investment of the companies' finance decision will fail, if a norm like "empire-building" is introduced into the investment function. "If they are committed to their missions, managers with sales or production orientations will be empire builders. In contrast, the role of the conscientious CFO is to curb those enthusiasms." But, following Zorn (2004), Akerlof (2006, 36f) admits, that when Modigliani-Miller first appeared, "it did not describe the investment decisions of large corporations. Now, quite possibly, changes in corporate decision-making since that time make it more realistic."
- The theory of a natural rate of unemployment will fail, if norms regarding the wage or salary increase that employees think they should receive enter their utility functions: This would cause the long-run inflation-unemployment trade-off to be downward sloping.
- And finally, the theory of rational expectations will be called into question as well, if the ways in which nominal wages and prices enter into preference functions - via employee's views of the wages they ought to receive and consumers' views of the process that ought to be paid – are considered.

The implications of such a norms-augmented macroeconomic approach (with norms in decision makers' objective functions) are still to be explored. Here we

could assume that norms might be a crucial device for consistency and persistence of macroeconomic regimes, as norms are fundamental for the welfare regime chosen and thus, for example, for the functionality of public finance.

1.2.5 Institutional complementarities and the consistency of macroeconomic regime constellations

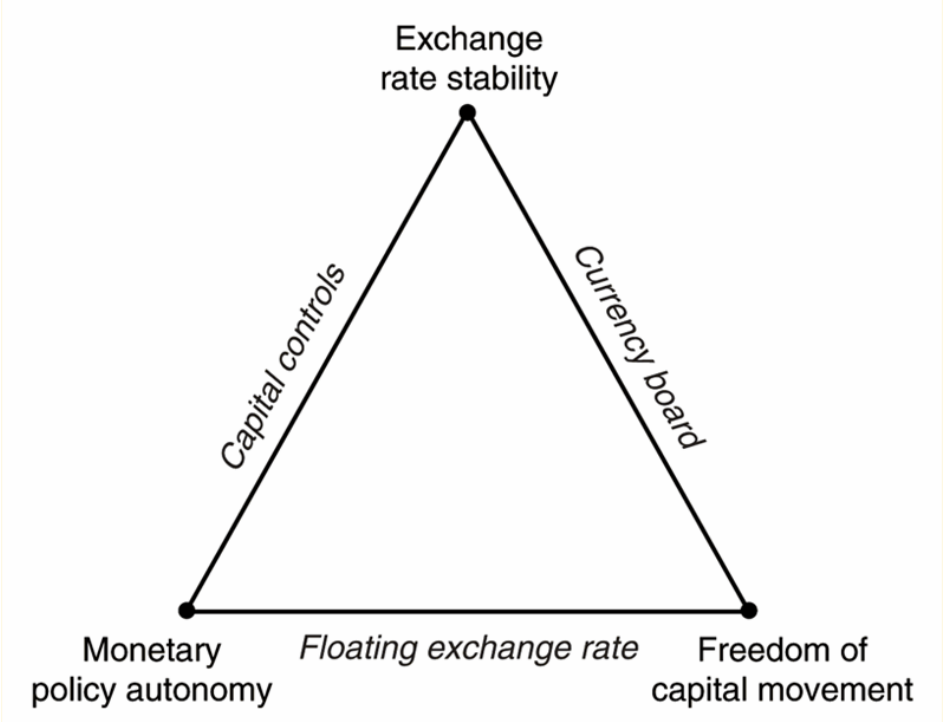
Aiming to assess the consistency of a particular macroeconomic regime, as for example in monetary or fiscal policy, we have to consider its interdependence or mutual causality with other fields of macroeconomic policy. For example, the interaction of monetary policy and wage bargaining is now widely studied (cf. Dullien, 2004 for an extensive overview on this literature) and has shaken the assumption of a long-term neutrality of monetary policy. Similarly, studies on the interaction of fiscal and monetary policy could demonstrate the different outcomes in terms of inflation and unemployment depending on the degree of cooperation between central bank and public finance (Heise, 2006).

Hall and Soskice extended the concept of *institutional complementarities* coined by Aoki to the field of political economy: "Here, two institutions can be said to be complementary if the presence (or efficiency) of one increases the returns from (or efficiency of) the other". Conversely, two institutions could be said to be *substitutable* if the absence of inefficiency of one increases the return of the other (Hall & Soskice, 2001, S. 17); cf. as well (Aoki, 1994), (Amable, 2003).

Implicitly the concept of institutional complementarities is not entirely new for macroeconomics. As one of the best examples to illustrate this point we may choose the largely stylized case of the *policy trilemma for open economies* (Figure 1-4). Actually it is a variant of the confidence problem or Triffin dilemma (Triffin, 1960). Let us start with the top vertex of the triangle: Given a regime of fixed exchange rates, a combination with an autonomous monetary regime is only possible if this country is capable of maintaining a regime of effective controls on capital flow. Thus, capital controls are complementary for a monetary regime which likes to control the external and internal value of its money simultaneously. This monetary regime has two possible substitutes. The first option is a monetary regime designed to allow full freedom of capital movement, but to

maintain the control of the external value of its currency at the same time: Here a currency board would be the institutional complement, implying a complete loss of control over the internal value of the currency. The second option is a monetary regime designed to allow full freedom of capital movement maintaining full control over the internal value of the currency: This would imply a complete loss of control over the exchange rate, hence, the external value of the currency.

Figure 1-4: Policy Trilemma for Open Economies



Source: (Krugman & Obstfeld, 2006)

The policy trilemma sketched here has many implications, for example for the complementarity of the monetary and the fiscal regime. We want to discuss only briefly some new insights concerning the question, whether to opt for a regime of free capital movement or not. In a recent comprehensive survey the traditional view that financial globalisation would lead “automatically” to higher GDP growth and less consumption volatility (by means of more efficient international allocation of capital, capital deepening, and international risk-sharing) is challenged by the new view that reaping the growth and stability benefits of capital account liberalisation depends significantly on *threshold conditions* to be met:

financial market development, institutional quality, macroeconomic policy regimes, and trade openness (Kose, Prasad, Rogoff & Wei, August 2006). Threshold conditions is just another word for institutional complementarities in this context: So, for example, they quote Mishkin arguing that inadequate or mismanaged domestic financial sector liberalisations have been a major contributor to crises that may be associated with financial integration (Mishkin, 2006). Furthermore, they find it compelling that a rigid exchange rate regime could make a country more vulnerable when it opens its capital market and show that combinations of capital account liberalisation have often ended in forced and messy exits to more flexible exchange rate regimes.

These examples of the policy trilemma of open economies and of the threshold conditions for successful capital account liberalisations demonstrate the importance of being aware of *institutional complementarities* for the success of a macroeconomic strategy under consideration.

1.3 Conceptual approach

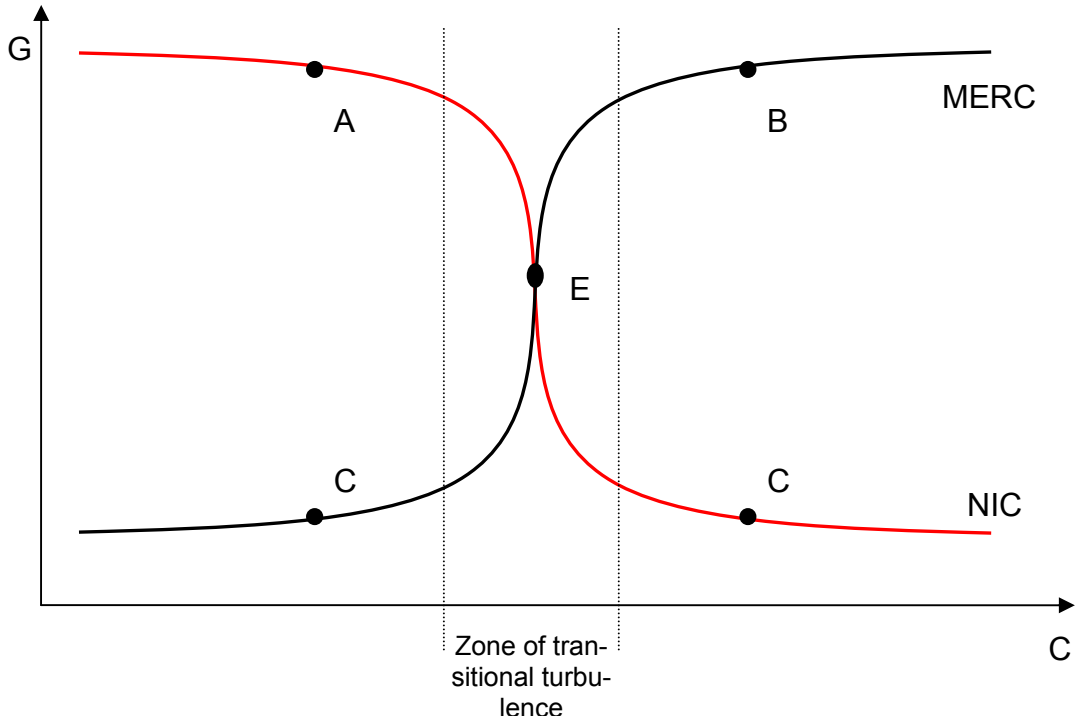
Summing up the above sketched research background, we could derive the following key concepts:

- *Normative-institutional complementarities (NIC)* might be a concept helping to explain the persistence of particular macroeconomic regimes, as well as of welfare regimes. They can change, if norms introduced in the utility function of decision-makers change, but normally this may be considered as a very slow, long-term process.
- Institutional complementarities are crucial for the consistency and the success of the *macroeconomic regime constellation (MERC)* chosen. If macroeconomic regimes are substitutes instead of complements, their combination will be inconsistent and will most probably lead to a failure of the *macroeconomic regimes constellation* chosen[1].

[1] We choose the concept of *macroeconomic regime constellations*, because the term *market constellations* preferred by Arne Heise may evoke misleading connotations with industrial economics.

Building on these concepts we could imagine different equilibria of MERC and NIC as demonstrated in the following figure.

Figure 1-5: Equilibria of normative-institutional complementarities (NIC) and macroeconomic regime constellations (MERC)



Source: e4globe concept

MERC, the *macroeconomic regime constellation*, could be described as function of the coordination between the openness of the goods market (openness), the exchange rate regime (XRR), the capital account regime (CAR), the monetary regime (MR), the fiscal regime (FR), the labour-market regime (LMR), and the welfare regime (WFR). The breakdown of a system of fixed exchange rates, for instance, would induce the MERC-curve to shift to the left, indicating a lower degree of macro-economic coordination “supplied”.

NIC, the *normative-institutional complementarity*, may be seen as function of the welfare regime (WFR), the labor-market regime (LMR), and the openness of the goods market. So, for example, a greater openness of the goods market would induce an accelerated structural change on the labor market, and thus, a higher demand for social security, hence, a more universal welfare regime.

The C-axis denotes the degree of coordination. Thus, on the left we find, according to Hall and Soskice (2001), LMEs and CMEs on the right. The G-axis denotes growth. The MERC-curve represents the “supply” of coordination by the macroeconomic regime constellation, the NIC-curve the “demand” for normative-institutional complementarities.

Consider point A: Here we have, according to the NIC, a relatively low “demand” for coordination, but high growth prospects, for example, because the Calvinist work-ethos or the “American dream” represent very individualistic ways to personal wealth: Thus, the *dominant mode of solidarity* is individual and complementary to the market as the *dominant locus of solidarity*. Due to the low demand for coordination by NIC at this point we could have a relatively stable equilibrium with MERC here (represented by the slight slopes of both curves), implying that only a low degree of coordination of the macroeconomic regime constellation would be required: The MERC-curve would have to shift to left.

Now consider point B: To reach this equilibrium, NIC would have to shift significantly to the right implying a much higher demand for coordination to reach the same growth prospects as in point A. Here the mode of solidarity is obviously less individualistic and, complementarily, the locus of solidarity is more public, as represented by the state. However, this equilibrium could as well be stable due to the similar slightness of the slopes of both curves as in point A.

At point E the slopes of both curves are significantly steeper and the equilibrium of NIC and MERC generates significantly lower growth prospect as the high road equilibria at point A und B. Even more, minor shocks to MERC or NIC or both could generate a high volatility of growth prospects. We therefore call this zone of steep slopes of NIC and MERC *zone of transitional turbulence*. Economies, formerly in relatively stable equilibria with high growth prospects at A or B could get trapped into this zone due to major shocks to MERC or NIC.

Hence the link between the two curves is in broad terms established by the overall welfare regime (including the labor-market regime and a propensity for an open economy). Consider, for example, the universal Scandinavian welfare regime: “… the enormous costs of maintaining a solidaristic, universalistic, and

de-commodifying welfare system means that is must minimize social problems and maximize revenue income" (Esping-Andersen 1990, 28). Thus, it has to espouse full employment as an integral part of its welfare commitment. Hence a high degree of coordination of the macroeconomic regime constellation is required.

1.4 Hypotheses

With respect to our main hypotheses mentioned above and the recent macroeconomic developments in the Scandinavian countries together with our theoretical assumptions, we can derive the following hypotheses to describe the core elements of the Scandinavian macroeconomic and welfare state model:

- The normative-institutional complementarities of the Scandinavian model are highly determined by the basic norms of social and gender equality (as well as by the transparency of the execution of public affairs).
- Key elements of the macroeconomic regimes are a broad acceptance of the equal priority of the objectives of full employment and price stability.
- Under the conditions of a regime of a fixed exchange rate the main burden in reaching these both macroeconomic objectives simultaneously was laid on a specific combination of fiscal and labor-market policy.
- This peculiar equilibrium of NIC and MERC came severely under pressure as the breakdown of the Bretton Woods system significantly reduced the degree of macroeconomic regime coordination: The NIC-MERC equilibrium moved into the zone of the transitional turbulence and became highly volatile.
- The reconstruction of a high-road equilibrium of NIC and MERC in Scandinavia was due to the successful reconstruction of a high degree of macroeconomic regime coordination by means of new instruments of monetary and fiscal policy.

1.5 Outline of the following

In the descriptive part of our inquiry, based on an extensive survey of the literature and the data, we are going to describe the main features of the Scandinavian welfare state. We will consider its egalitarian bases and norms and analyse its consent-forming institutions such as the labor-market policy and the social security system as well as the tax system as its financing basis. Then we will try and explore the effects of the confidence-building institutions and policy on the employment rate, the redistribution of income, the social expenditures and tax revenues. Finally, we present the Rehn-Meidner model as an early, archetypical example of the interaction between the normative-institutional complementarities and the macroeconomic regime constellations found in Scandinavia.

In the econometric section, we first aim at an analysis of the macroeconomic regimes of the Scandinavian countries Sweden, Finland and Denmark under a medium to short-run perspective as corresponds to our first hypothesis. This is realised by separately calculating indicators for fiscal, monetary and wage policy in the three countries, as well as by identifying structural breaks and changes in regime using correlation analysis and state-space models. Second, we attempt to identify interdependencies between the different areas of macroeconomic policy and output in a SVAR-model. With the aim of verifying our second hypothesis, then we will analyse the impact of different welfare state proxies on the long-run growth trend in the Scandinavian countries. Due to the data structure of the welfare state proxies, this is done in a cross-section analysis of a sample of industrialised countries.

2 THE SCANDINAVIAN WELFARE STATE

The Scandinavian welfare state, represented in this study by Denmark, Finland and Sweden, is characterised by its egalitarian attitude towards its citizens. In general, politics aim at treating different population groups equally as far as gender, age, class, family situation, region etc. are concerned (Kvist, 2002). It is the state which has large social liability towards the market and the civil society. Accordingly, the Scandinavian welfare state's economic system finds itself socially embedded, and its cornerstone are social rights (Kvist, 2006), which, as a matter of fact, are considered as civil rights, i.e. they do not depend on the individual's position in the production process (Kaufmann, 2003). Although every citizen is entitled to public transfers or social services, covering a multitude of different social situations, these universal social rights are highly individualised, as transfer payments and social services are principally granted on the basis of the individual situation (independent of the situation of the rest of the familiy[2]) (Kvist, 2002).

Initially, we will give a brief survey on the egalitarian bases and norms which characterise the Scandinavian welfare state, and will then continue with describing the Scandinavian countries' consent forming institutions and their macroeconomic effects in Denmark, Finland and Sweden. Finally we present the Rehn-Meidner model as an early archetypical example for the interaction of the normative-institutional complementarities and the macroeconomic regime constellations of the Scandinavian economies.

2.1 Egalitarian bases and norms

Liberal economists in the tradition of Adam Smith assume that, the lesser an economy is regulated, the more efficient it can work and hence produce the greatest possible equity, if only the *invisible hand* is not constrained. From the normative point of view of the Scandinavian welfare state, however, efficiency is

not the essential precondition for obtaining equity. On the contrary, equity and equality have to be established before the economy is able to work efficiently. If inequities and inequalities hindered affected citizens from being productive, this would undermine the political system and destroy the political and social consensus. Hence equity and equality are mandatory for the political as well as the social continuity (Kersting, 2000).

The principal idea of equality and the efforts to create and ensure equality are often regarded as a "passion", being a substantial part of the Scandinavian cultural heritage: "The welfare state did not create this passion for equality, but rather is itself an economic, social, cultural, and organisational expression of efforts to promote it", (Andersen 1984, here cited by Kaufmann, 2003). Hence the Scandinavian welfare state finds itself deeply embedded in a social and political consent where equality itself and its importance have never been really discussed, but where the issues being discussed are rather related to how the current level of equality can be guaranteed or even increased. Two main equality targets of the Scandinavian welfare state are gender equality and income equality.

The necessity of equal opportunities for women in both political and working life has been emphasized for many decades.[3] "Equal working life and a more even allocation of responsibilities between men and women in the home are not only a matter of equality and justice. They are necessary for long-term economic growth.", (Nordh, 2005). Allowances for families and children are designed generously to give women the opportunity to combine raising a family and take up employment. Furthermore, high marginal tax rates on the first earner and the direct link between wages and many social benefits give women additional incentives to work (Thakur, Keen, Horváth & Cerra, 2003). As a consequence, the share of women in the labour force is, as we will later show in greater detail,

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[2] Allowances for families with children and social benefits are exempt from this individualisation Kvist, 2002.

[3] In Sweden, for example, a woman's entitlement for her children's allowance does not depend on her marital status; the fact that she is a mother, be she married or single, is sufficient for receiving transfer payments from the government Kaufmann, 2003.

very high compared to other OECD countries; but the desire for complete equality has not been satisfied yet - Scandinavian governments still feel that much remains to be done in the area of gender equality[4] (Norden: Nordic Council and Nordic Council of Ministers, 2006).

As to income equality, this has been targeted by a redistribution of incomes. Solidaristic wage policy has been fostered by the implementation of centralised wage bargaining, which helps equalising the distribution of gross earning by both compressing the wage scale and promoting employment of low-skilled employees (Thakur, Keen, Horváth & Cerra, 2003). However, it must be emphasized that income equality in the terms of the Scandinavian welfare state does not mean a general equalisation of wages, but, on the contrary, the ambition to establish fair wage differentials, which then should "reflect 'objective' differences in working environment, responsibility, experience and education, not short run profit (or labour market) conditions.", (Erixon, 2000).

2.2 Consent forming institutions of the Scandinavian countries

Long before the United Nations passed an "International Covenant on Economic, Social and Cultural Rights"[5] in 1966 (UN (United Nations), 1966) (which Denmark, Finland and Sweden ratified in 1976) and thus laid down, among others, the right for social security, the state's responsibility for the welfare of its citizens had already been common consent in all three EU-Scandinavian countries.

In Sweden, for instance, this was partly based on the Lutheran state church, which contributed largely to the extensive activity of the public sector. Furthermore, the historically strong position of the Swedish yeomen was an important

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[4] For instance, there is still inequality between parents: Women with children receive lower wages per working hour than childless women (whereas fathers are paid a higher wage per hour than men without children). In general, equal payment of men and women for the same job has not been achieved in practise yet, and about 50% of the women in Scandinavian countries work in traditionally "female" jobs, as health and education services, which often implies lower pay and fewer career possibilities Nordh, 2005.

[5] These economic, social and cultural rights are not suable by individuals, but the ratifying states commit to guaranteeing these rights for their citizens as far as possible, Kaufmann, 2003.

factor for the development of a welfare state model including all inhabitants, not only industrial workers. Last but not least, Sweden lacked to a large extent constitutional conflicts, so the state's responsibilities and its dimensions were never actually questioned (Kaufmann, 2003).

"The Nordic welfare systems are based on a high degree of universalism, i.e. all citizens are entitled to basic social security and services irrespective of their position in the labour market. The universalism has contributed to a broad public support to the welfare policy", (Norden: Nordic Council and Nordic Council of Ministers, 2006). In the Scandinavian welfare state, fair distribution is the central idea influencing every policy sector. The government is responsible for ensuring that everything is done to achieve a more equitable situation. As a matter of fact, redistribution towards a higher degree of equality has not been only a political consensus within the social-democratic party, which has had large influence in each of the three EU-Scandinavian countries for decades, but also, and most notably, it has been a social consensus of a great majority of the residents. The solidaristic attitude within Scandinavian societies was consolidated and fostered by a large transparency of political decision-making, (Thakur, Keen, Horváth & Cerra, 2003).

The broad and solidaristic consensus of Scandinavian societies on the welfare state and its characteristics has been consolidated by institutions which were designed to maintain confidence in the government's policies and the corresponding high public expenditures. We are going to present two major consent-forming institutions: the labour market policy and the social security system. Another paragraph will deal with the tax system in the EU-Scandinavian countries, as labour market policies and social benefits are financed mostly through large tax revenues.

2.2.1 Labour market policy

Labour market policy has proved to be one of the major consent-forming institutions of the Scandinavian welfare state.

One of the traditional labour market instruments of the Scandinavian model ensuring a more equal distribution of labour income is the centralised wage bargaining. Labour unions combined into a unions' federation, as did the employers' associations, and these two labour market parties have then been mandated to meet and negotiate wages nationwide (Ortigueira, October 20, 2006). Naturally, this requires a high unionisation level. As the eligibility for unemployment benefits required union membership for at least one year before becoming unemployed, the unionisation rates in the EU-Scandinavian countries have been considerably high (in the order of 90%) (ibid.). From the early 1980s on, however, wage bargaining has been more and more decentralised in Denmark and in Sweden. Since the late 1990s, however, Sweden has aimed – more or less successfully – at reintroducing centralised wage bargaining. Finland, however, has never given up on centralised wage bargaining (although there were years, when a nationwide wage agreement could not be found). Centralised wage bargaining also tends to diminish wage distribution, particularly at the bottom of the wage scale. This compression of the wage scale is pursued by unions for the reason of equity (Johansson, 24.07.2006).

However, centralised wage bargaining does not only hold advantages for employees in view of income and equity. It is assumed that the negotiators are well aware of the macroeconomic risks of high wage settlement, and in order to avoid unemployment and inflation, they will find agreements which include relatively low wages and high employment (Thakur, Keen, Horváth & Cerra, 2003).

Another common and well-approved instrument of the Scandinavian labour markets is the use of Active Labour Market Programmes (ALMPs). ALMPs have been implemented to foster re-employment of the unemployed through improving their skills and qualifying them further. This is done either by vocational training, like computer courses or classroom training of technical and administrative occupations, or by on-the-job practice, like start-up grants or subsidised on-the-job training. Another form of ALMPs are wage and employment subsidies, which help sustaining the unemployeds' work experience (Carling & Richardson, 2001). The emphasis on qualification does not only reduce the time

the unemployed remain without a job, but, by attacking skill mismatches, this also helps lowering structural unemployment.

Additionally, the EU-Scandinavian countries put emphasis on temporary and part-time work. In Sweden, for instance, a large availability of part-time work, especially in the public sector, has been decisive mainly for women with children to take up employment, because it enables them to combine family care and breadwinning (Thakur, Keen, Horváth & Cerra, 2003). Thus, their high participation in the labour force also increases the employment rate.

2.2.2 Social security system

The Scandinavian welfare state is based on the assumption, that it does not matter which social class or which market position a resident has – every citizen has similar rights. Its social security system aims at solidarity within the society and enhances equality through its universal character. Everybody profits of it, everybody depends on it – and hence, most probably everybody feels obliged to pay for it (Esping-Andersen, 1998). It must be emphasised, that equally satisfying the minimal needs of every citizen is not the purpose of the social security system. On the contrary, it is designed to create equality on the highest possible level (ibid.).

The social security system includes health care, which all residents have access to (independent of whether they pay taxes or not), as well as transfer payments. Only a part of the social transfers are means-tested, as, for instance, social assistance, childcare payments and student loans. Principal benefits which are not means-tested - unemployment benefits, sickness benefits, pensions, parental and child benefits - do depend on the income level, though, but are relatively generous, compared to the average OECD level of transfers to households (Thakur, Keen, Horváth & Cerra, 2003).

In the period of 1980-2001, social spending in the EU-Scandinavian countries were not affected by cuts, despite the severe economic crises which all had to suffer from. Maintaining the high level of government's social expenditures throughout times of recession was possible because of “the wide degree of

popular support for many of these services, especially where they are well financed and of high quality as in the social democratic welfare states", (Glyn, 2006), such as the EU-Scandinavian countries.

Both ALMPs and the universal social security system require a broad financial basis, which, in the Scandinavian welfare state, is achieved through maximized tax revenues.

2.2.3 Taxes

In the early 1990s, the three EU-Scandinavian countries established the so-called "dual income tax system", which combines progressive taxation of labour income with a flat tax rate on capital income. Denmark was the first to introduce the dual income tax in 1987, followed by Sweden in 1991 and Finland in 1993 (Genser, June 07-09, 2006).

The progressive taxation of labour income has an immediate redistributive effect by reducing the difference between the inequality of market incomes and that of disposable incomes. A flat tax on capital income, however, seems to contradict the egalitarian aim of the Scandinavian welfare state. In view of the liberalisation of the capital markets in the 1980s, a flat tax on capital income was given preference to progressive taxation, though, in order to collect the largest possible sum of revenues, trusting that a flat tax on capital income would avoid the evasion of tax through investments abroad and the "failing to declare the receipts" (Thakur, Keen, Horváth & Cerra, 2003), at least to a certain extent.

Naturally, implementing the dual income tax made the tax system considerably less progressive. However, Sweden, for instance, managed to absorb the resulting additional inequalities by increasing the redistribution on the income side through higher child allowances and higher housing allowances (both only available to those with children), (Thakur, Keen, Horváth & Cerra, 2003).[6]

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[6] Consequently, the redistribution between residents with children and those without children has increased after the tax reform, "while within household types it has, if anything, fallen" Thakur, Keen, Horváth & Cerra, 2003.

The Scandinavian welfare state has often been criticised for granting very large (or even too large) social benefits to its residents. Social benefits in EU-Scandinavia are generous indeed, however, it must be pointed out that the majority of them is taxable. Denmark, Finland and Sweden raise taxes on unemployment benefits, sickness benefits, retirement pensions, disability pensions and on social benefits granted to non-insured persons (Nordic Social-Statistical Committee (NOSOSCO), 2006). In accordance with the welfare state's emphasis on increasing gender equality and hence orientating its social policy towards a higher participation of women in political and social life, children allowances and housing allowances are exempt from taxation (Nordic Social-Statistical Committee (NOSOSCO), 2006).

2.2.4 Brief summary

In the Scandinavian welfare state, both labour market and social security contribute to generating and maintaining broad public consent for the welfare policies.

One of the instruments of the labour market is highly coordinated centralised wage bargaining, which, through income redistribution and compression of the wage scale, strongly enhances a high degree of equality among the employed. The implementation of ALMPs ensures that the participation rate in the labour force has been considerably high (and as we will see in paragraph 2.3, even higher than the EU-average and the OECD-average) and thus an above-average share of residents profits from the equalising effects of centralised wage bargaining. Centralised wage bargaining also implies negotiating levels of income which are acceptable for all parties involved – employees and employers (and also the state, as it is presumed that the former two parties will avoid risking unemployment and inflation and hence will settle wages at moderate levels), enlarging the public consent to the overall working population. The emphasis on temporary and part-time work, particularly giving women with children the opportunity to take up work, has additionally increased the employment rate in the EU-Scandinavian countries and also contributed to increasing gender equality.

The social security system has also an egalitarian character. The high level of social benefits and the universal eligibility for one transfer payment or the other contributes to the redistribution of income towards more income equality. The high allowances for families with children, independent of the women's marital status, improve social equality in general and gender equality in particular.

As the equalising effects of the labour market and the social security system involve a large majority (labour market) or even the overall population (social security system), the public consent for the Scandinavian welfare state and its institutions is almost all-encompassing – even though this implies a high tax burden for the residents. Trying to provide the highest possible level of equality, as, for instance, through ALMPs and extensive social expenditures, requires a broad tax revenue basis, as these measures are mainly financed through taxes. Keeping employment at a constantly high level, redistributing income, raising taxes on social benefits and a flat rate tax on capital income all contribute to augmenting the welfare state's financial basis. The rate of taxation in the EU-Scandinavian countries is, as a matter of fact, considerably high, but it is well-based on society's ample consent, as a large amount of the public revenues prove advantageous for the residents and a high degree of equality among them.

In the following, the effects of the consent-forming institutions mentioned above will be described in detail.

2.3 Effects of Confidence-Building Institutions and Policies

The Scandinavian welfare state has committed itself to the objective of full employment. At the same time, it is absolutely dependent on its realisation. Tax revenues have to be maximised to finance the universal social security system, which can only be achieved through a maximum level of employment (Esping-Andersen, 1998). Therefore, in the following, we will take a closer look at the employment rates, the degree of income redistribution, social expenditures of Denmark, Finland and Sweden in order to scrutinise the empirical data in view of the degree of equality in the EU-Scandinavian countries. Furthermore, we will

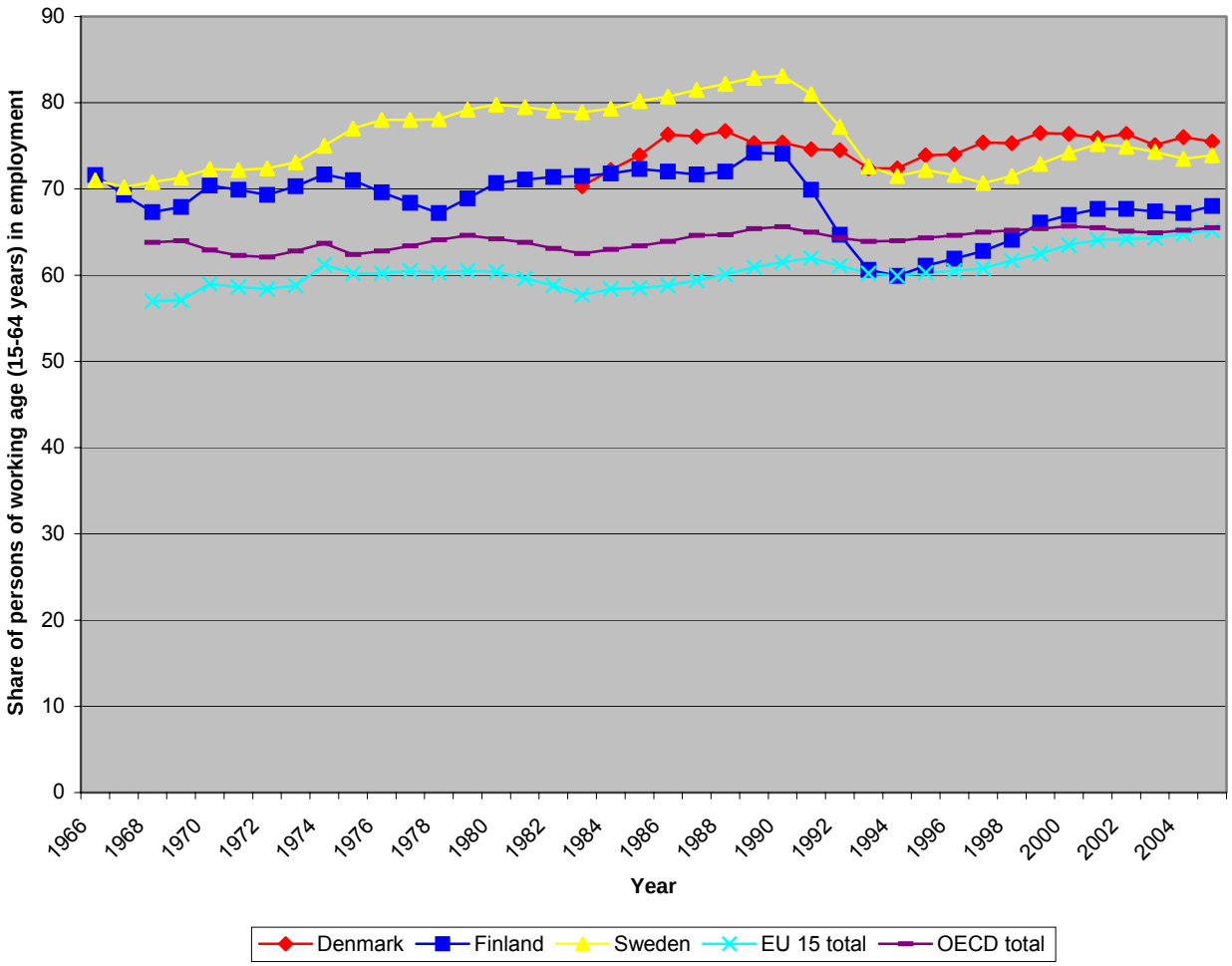
examine their total tax revenues, as these are vital for funding the extensive social security system.

2.3.1 Employment rate

Full employment has been one of the main, if not the main target of macroeconomic policy in the Scandinavian Welfare State. In order to achieve a maximum participation in the labour force, ALMPs were introduced and temporary and part-time labour have been promoted, the latter aiming particularly at increasing women's share of the labour force.

2.3.1.1 Total employment rate

Figure 2-1: Total employment rate in EU-Scandinavia, 1966-2005



Source: OECD, e4globe calculations

Sweden's employment rate (see Figure 2-1) has had the tendency to rise, with the exception of two declines – a considerable one between 1990 and 1994, when a severe economic crisis hit the country, and, after a slight increase from 71.5% in 1994 to 72.2% in 1995, another smaller decrease from 1996-1997. Nonetheless, it always stayed well above the OECD-average between 1966 and 2005 and has never fallen under 70.2%, which was Sweden's 1967's employment rate. (The maximum value, which the OECD-average employment rate gained between 1968 – first year for which OECD-average values are available - and 2005, was 65.7% in 2000. In that year, Sweden's employment rate was 74.9%.)

For the overall period of 1966-2005, Finland's employment rate shows at first a development that differs from Sweden's. Starting in 1966 with an even higher employment rate than Sweden (71.6%), it already began to decline in the following year, and after a few ups and downs, Finland experienced the first major decrease of its employment rate between 1974 and 1978 from 71.7% to 67.2%, due to an exceptional price shock after the 1st oil crisis and the following inflation. Sustained by the bilateral trade with the Soviet Union, Finland successfully weathered the 2nd oil crisis and, until 1989, Finland's employment rate constantly increased until it reached its peak of 74.2%. The economic recession of the early 1990s had an even more severe impact on Finland than on Sweden, and between 1991 and 1994, the total employment rate sharply declined by almost 15 percentage points to 59.9% in 1994 (Finland's overall minimum), being even below OECD-average (64%) in that year. From 1995-2005, Finland's employment rate has slowly recovered from this free fall, reaching 68% in 2005, which is still more than 3 percentage points below its initial rate of 1966.

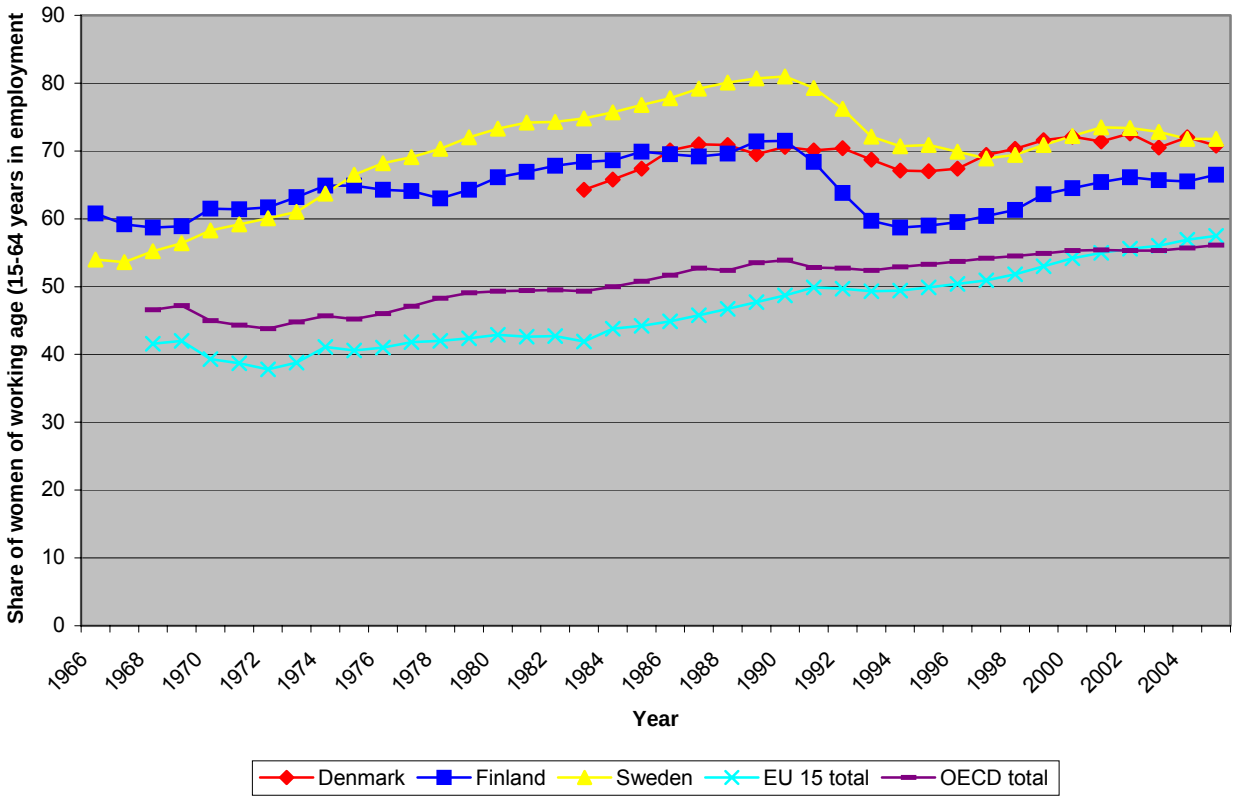
OECD records for Denmark only start in 1983. Compared to Sweden and Finland, Denmark's employment rate shows the least volatile development. Having increased fast in the first three years from 70.3% in 1983 to 76.3% in 1986, it reached its peak of 76.7% in 1988. In order to avoid an overheating of the economy, the Danish authorities implemented an administrative credit market tightening in order to enhance private saving, and in the following years, growth slowed. As a consequence of this and also of the early 1990's economic

crisis, the total employment rate went through a slight downward tendency in the years from 1988 (76.7%) until 1994 (72.4%), but it resumed its growth in 1995, almost obtaining its peak of 1988 in 2004 (76%). From 1994, Denmark's employment rate has been consistently higher than Sweden's.

2.3.1.2 Participation of women in the labour force

All three EU-Scandinavian countries have endeavoured in increasing the share of women in the labour force, mainly by fostering part-time work, in order to give the female residents the opportunity to both raise a family and work, which raises the total employment rate and, at the same time, improves gender equality.

Figure 2-2: Women's share of the labour force in EU-Scandinavia, 1966-2005



Source: OECD, e4globe calculations

As can be clearly seen in Figure 2-2, the participation rate of women in the labour force has constantly been considerably higher than both the EU-average

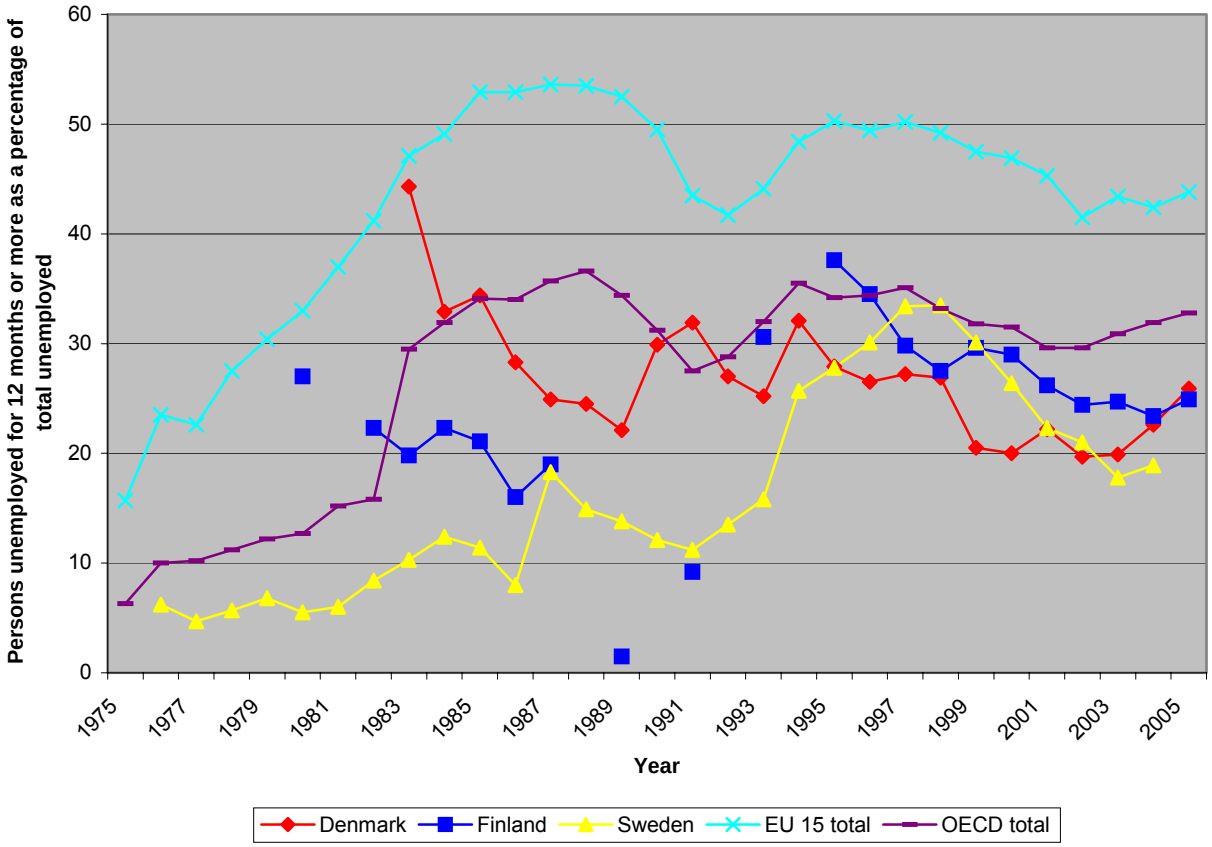
and the OECD-average. Unfortunately, records for Denmark only start in 1983, but nonetheless since that moment they show a clear picture, which is congruent to that of Sweden and Finland. The share of women in the labour force has always been high, reaching its peak in 1990, with 70.6% in Denmark, 71.5% in Finland and 81% in Sweden (OECD-average in 1990: 53.9%, EU-average in 1990: 48.7%). Between 1991 and 1996 (Denmark and Finland), respectively 1997 (Sweden), the participation rate decreased due to the recession which all of the three countries experienced during that time and the resulting growth of general unemployment. After that, in the course of the economic recovery, the participation of women in the labour force has increased again, constantly in Finland and Sweden and with slight movements up and down in Denmark. However, Sweden and Finland have not been able to regain the high level they had during the 1980s, whereas Denmark has not only been successful in returning to its 1990 peak, but even managed to even surpass it in the years of 1999-2002 and in 2004.

Nevertheless, in spite of the developments mentioned above, the share of women in the workforce in Denmark (70.8%), Finland (66.5%) and Sweden (71.8%) in 2005 was substantially higher than the EU-average (57.5%) and the OECD-average (56.1%).

Summarising the above, it can be stated that the EU-Scandinavian countries all have successfully aimed at attaining a very high level of employment (compared to the OECD-average and the EU-average during the observed period) both in terms of the total employment rate and the women's share in the labour force. It seems likely that ALMPs and the promotion of part-time and temporary employment have enhanced a high degree of labour market participation in general and sizeable improvements of the employment rate after economic downturns in particular. For instance, figures show that the economic crisis in the early 1990s also took its toll in Denmark, Finland and Sweden, but obviously, these countries were able to recover within rather short periods of time. Furthermore, increased unemployment due to downswings of the economy has hardly led to structural manifestations in the labour market, but long-term rates of unemployment were considerably more volatile than the average in the EU- and in

the OECD-countries and have always remained sizeably lower than the EU-average, and mostly also lower than the OECD-average (see Figure 2-3).

Figure 2-3: Long-term unemployment rate in EU-Scandinavia, 1975-2005

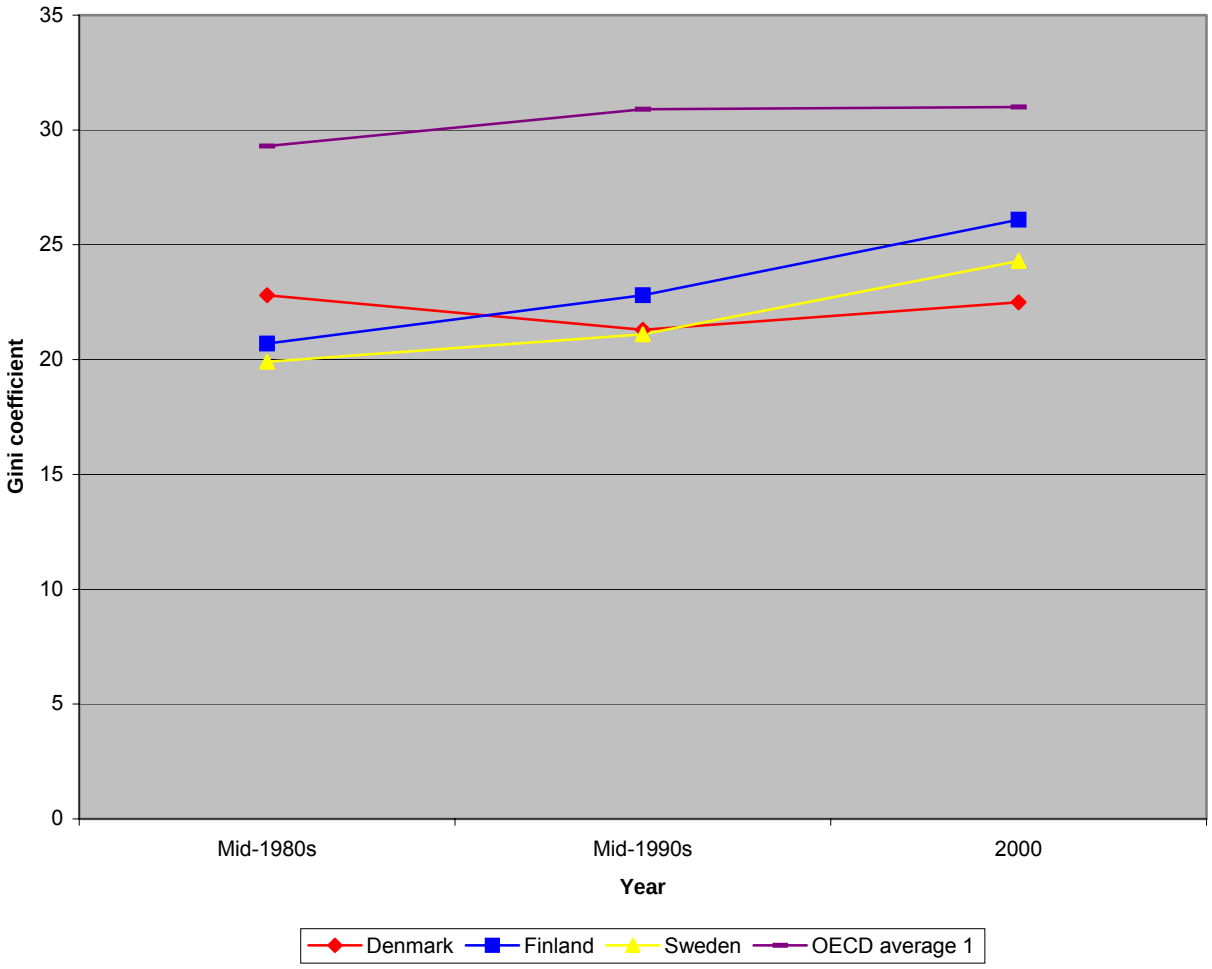


Source: OECD, e4globe calculations

2.3.2 Redistribution of Income

All consent-building policies described under chapter 2.2 basically target the redistribution of unequal market incomes towards more equal disposable incomes. And, indeed, as the Gini coefficients for Denmark, Finland and Sweden show, the redistribution of household disposable income has been successful in the EU-Scandinavian countries during the last two decades (see Figure 2-4).

Figure 2-4: Distribution of household disposable income among individuals in EU-Scandinavia, mid-1980s-2000



Source: OECD, e4globe calculations

In the mid-1980s, Sweden was the most efficient country in view of redistributing income (Gini coefficient of 19.9) closely followed by Finland (20.7) and Denmark (22.8). A decade later, Sweden still showed the best performance (21.1) of the three, but then Denmark had almost caught up (21.3), leaving Finland in third place (22.8). Other than Denmark that was able to improve its income redistribution, Sweden and Finland have changed for the worse. In 2000, finally, Denmark's Gini coefficient (22.5) almost returned to the value it had in the mid-1980s. Sweden and Finland's Gini coefficients (24.3 respectively 26.1), however, have deteriorated considerably.

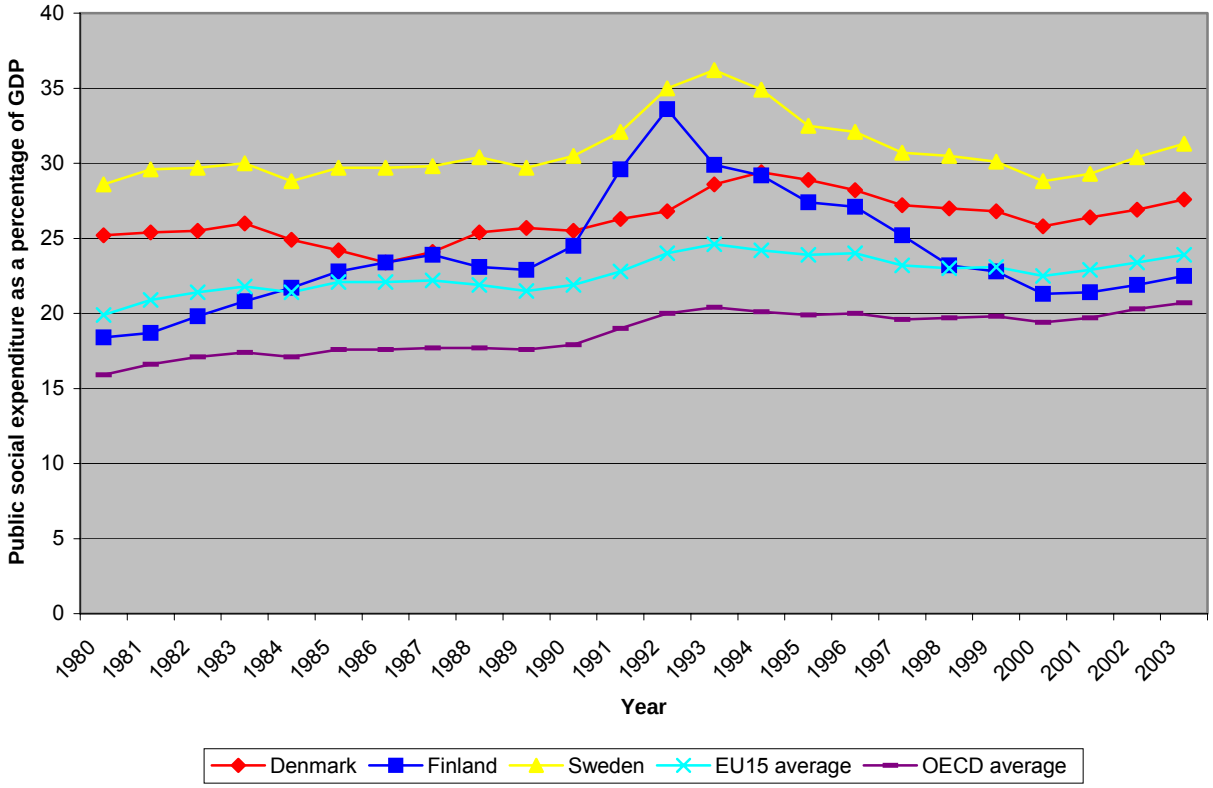
The different developments of the Gini coefficents reflect the different economic progressions, especially the different durations of recovery after the crisis in the early 1990s in these countries, which will be described in detail in chapter 3.

Nonetheless, it must be pointed out that during the overall period from the mid-1980s until 2000, all three EU-Scandinavian countries maintained the three top positions in the OECD-ranking and showed a considerably better performance than the OECD-average.

2.3.3 Public social expenditures

A broad range of social benefits and a universal social security system have led to an extensive level of public social expenditures in Denmark, Finland and Sweden. OECD data available for the period of 1980-2003 show that all three countries have continuously spent more on social services than the OECD-average has done (see Figure 2-5).

Figure 2-5: Public social expenditure to GDP ratio in EU-Scandinavia, 1980-2003



Source: OECD, e4globe calculations

Out of the three, Sweden continuously shows the highest public social expenditures, starting in 1980 with 28.6% (Denmark: 25.2%, Finland: 18.4%). The OECD data show that, in the face of the economic crisis in the early 1990s, all three countries largely increased their public social expenditures, hence promoting the work of the automatic stabilisers.

While Finland proved to be the country which was affected most seriously by this recession, it was not only the first to raise its public social spending in 1990, but also the one with the largest increase, namely by 10.7 percentage points between 1989 (22.9%) and 1992 (33.6%). As will be explained in greater detail in chapter 3, the crisis had not yet been overcome by 1993, but the banking crisis in 1992 forced Finnish authorities to cut down social expenditures, despite their stabilising function. Therefore, Finland reduced its social expenditures from

1993 until 2003 to an overall 22.5%, which is even below the rate they had had before the increase in 1990.

Sweden also started to raise its public social expenditures in 1990, but compared to Finland, it progressed more slowly (the peak was reached in 1993 at 36.2%) and to a lesser extent, i.e. by 6.5 percentage points from 29.7% in 1989. From 1994 to 2000, the rate of social expenditures was gradually reduced to 28.8% and since then has been increased again to 31.3% in 2003.

Denmark was the last to increase public social expenses in 1991 and showed the smallest amplitude of 3.9 percentage points between 1990 (25.5%) and its maximum expansion in 1994 (29.4%). Like Sweden, Denmark then decreased public social expenditures until 2000 (25.8%) and has afterwards raised them step by step to 27.6% in 2003.

Throughout the observed period of 1980-2003, Denmark and Sweden not only surpassed the OECD-average, but also the EU-average, whereas Finland started below the EU-average in 1980, surpassed it in 1984 and sank below it in 1999, from 2001 to 2003 its progress paralleled the EU-average graph showing 1.5 percentage points (2001 and 2002) respectively 1.4 percentage points (2003) less.

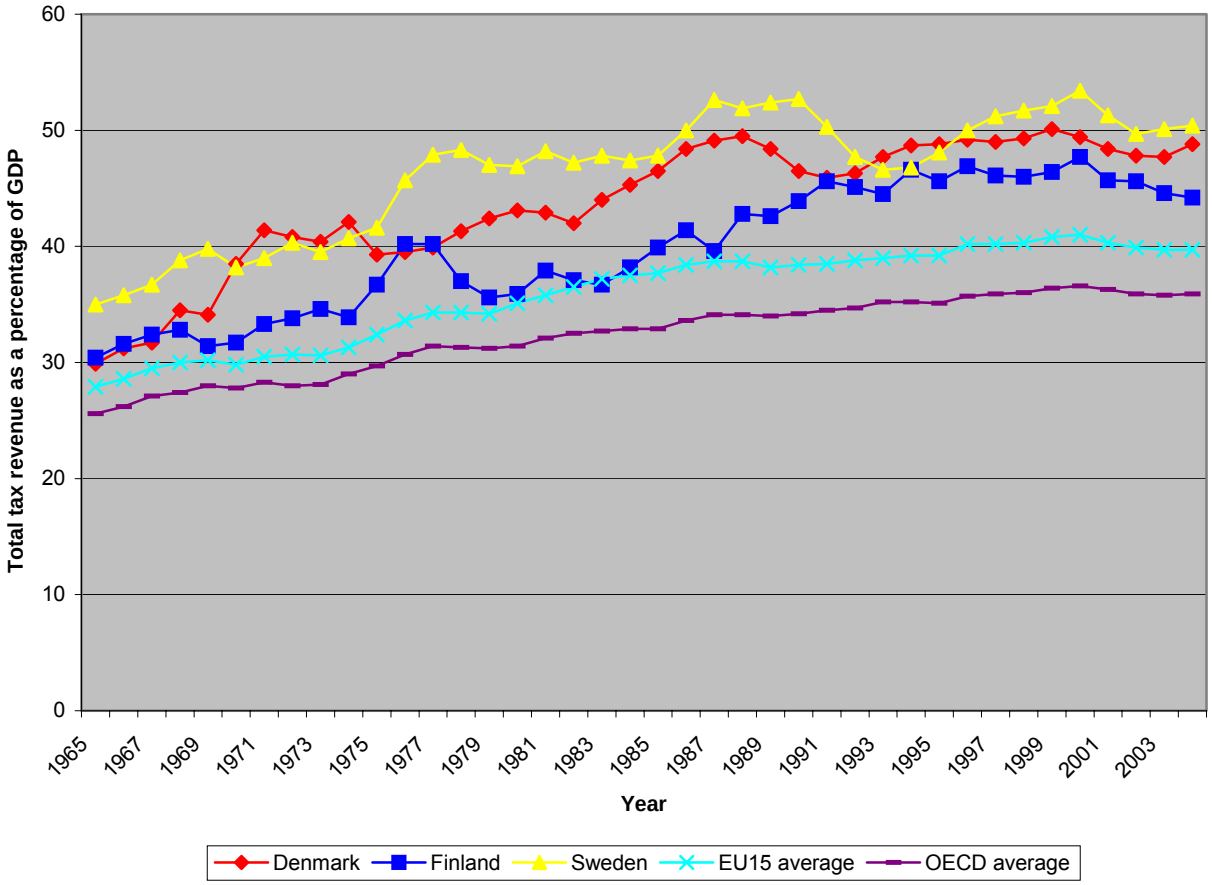
The development of public social expenditures in all three EU-Scandinavian countries does not only show a high level compared to OECD-average and partly also to EU-average, but it also seems to corroborate the assumption underlying this study, namely that these social expenditures fulfilled their function as automatic stabilisers in economic downturns. This will be discussed more detailed in chapter 3.

2.3.4 Tax revenues

Redistribution of income, high employment rates including a large participation of women in the labour force, and a number of generous social benefits liable to taxation led to considerable tax revenues generating a broad financial basis for the three EU-Scandinavian countries' welfare policy.

OECD data show no records for the period of 1961-1964, so this short analysis starts in 1965.

Figure 2-6: Total tax revenue in EU-Scandinavia, 1965-2005



Source: OECD, e4globe calculations

Figure 2-6 illustrates that, since 1965, Denmark and Sweden have been able to collect much higher tax revenues (as share of the GDP) than both the OECD-average and the EU-average. Sweden (35%) had started with 5.1 percentage points more than Denmark (29.1%) in 1965, but Denmark managed to catch up during the course of time, twice even surpassing Sweden slightly 1970-1974 and 1993-1995. In 2004, Denmark's tax revenues as share of the GDP (48.8%) were only 1.6 percentage points lower than those of Sweden (50.4%).

Finland had had about the same starting situation as Denmark (30.4% of GDP in 1965), but has not been able to reach the same level as Denmark or Sweden. Finland's development with regard to tax revenues also shows an upward trend,

but almost entirely on a lower level. It was only in 1976 and 1977 that Finland collected slightly more taxes than Denmark, and it almost managed to reach Denmark's tax revenue level in 1991 and that of Sweden in 1994. Apart from these few exceptions, Finland remained well below the tax revenues of the other two countries.

Nevertheless, all three EU-Scandinavian countries collected considerably more taxes as share of the GDP than the OECD-average throughout the observed period of 1965-2004. Sweden and Denmark have also managed to exceed the EU-average during that time. Except for 1983, when Finland fell below the EU-average by 0.5 percentage points, it also maintained a higher tax revenue level, although, as said before, considerably lower than that of Denmark and Sweden.

The Scandinavian welfare state works as a point of intersection between market, state and family, constantly striving to moderate the inequalities of market outcomes by means of redistributing incomes and by providing universal social security and a broad range of social benefits. Naturally, the large budgetary expenditures necessary for welfare services require high tax revenues; in 2005, income taxes on the average worker (OECD 2007) were 47.9% in Sweden, 44.6% in Finland and 41.4% in Denmark, whereas the OECD-average income tax on the average worker was 37.3%. However, as already stated above, the EU-Scandinavian citizens consent to the extensive tax burden, as they find the advantages of the welfare state to outweigh the disadvantages of high taxes.

A connecting link between the Scandinavian welfare state and its macroeconomic policies is the Swedish Rehn-Meidner-Model, which aims at solving the conflict between the two mutually exclusive targets of full employment and price stability, which are generally regarded as diametrically opposed.

2.4 The Rehn-Meidner model: an early example of the NIC-MERC-interactions

The macroeconomic reality of a Welfare State is complex and can be described best as "an interwoven bundle of different policies on taxation, … social affairs and labour markets, just to mention a few" (Kvist, 2006). In the following, the

Rehn-Meidner-Model (RMM), which was developed and presented first in 1951 by the two Swedish trade union economists Gösta Rehn and Rudolf Meidner, will be introduced as an early archetypical example for the interaction of the normative-institutional complementarities and the macroeconomic regime constellations of the Scandinavian economies.

Rehn and Meidner developed their model at a time when the Swedish economy was overheated. After World War II, a post-war depression had been expected, and accordingly, a Keynesian programme for full employment was developed. However, the anticipated depression did not come true, but, on the contrary, Swedish industry (being specialised, among others, in investment goods) profited from the fast economic recovery of Western Europe and from the increase in households' demand for consumer durable goods. Expansive economic policy additionally augmented the inflationary tendencies (Erixon, 2000).

It was therefore necessary to find a solution for the conflict between the objectives of full employment and price stability, which emerge from expansionary fiscal and monetary policy. Hence, the central idea of the RMM was to combine full employment and growth with price stability and equity. The means Rehn and Meidner propose in order to achieve the four objectives are: restrictive general economic policy, solidaristic wage policy, labour market policy and marginal employment subsidies (ibid.).

In the RMM, the restrictive general economic policy mainly has to be tight over the business cycle, in order to cut back the rate of inflation, to foster rationalisations and structural change in low-profitable industries and companies and to limit wage drifts.

Solidaristic wage policy, too, aims at curbing wage disparities by providing the same wage rates for comparable work, allowing, however, wage differentials between different groups of wage earners. Together with a restrictive general economic policy, solidaristic wage policy jeopardises the persistence of low-profitable companies and thus leads to rationalisations in least profitable industries.

Rehn and Meidner predicted that restrictive general economic policy and solidaristic wage policy would lead to so-called “islands of unemployment” (Lundberg, 1996). Therefore, they argued, it is necessary to counter-balance the negative effects of unemployment by labour market policy, mainly through supply-orientated measures, such as relocation and retraining grants and occupational programmes, and by improving the matching process on the labour market, so that the employees who are made redundant in low-productivity companies will then be transferred through labour market policy measures to companies with higher productivity. The increased flexibility on the labour market then would not only induce growth and help hiring labour in profitable sectors, but also curb inflation, because greater labour mobility would also mitigate wage increases and shortage of labour in those sectors.

Additionally, marginal employment subsidies are introduced in the RMM to fight unemployment and inflation. They should be offered to companies in all regions and sectors and for all sorts of labour, however, only to recruiting companies, whose marginal costs they would reduce. In case product markets are competitive or the prices are determined by companies’ marginal costs, the effect would be a decrease of prices. Rehn and Meidner show that the price-reducing effect and the raise of employment would be larger for marginal subsidies than for intra-marginal subsidies, as for instance, reducing pay-roll taxes, which is also the case for an open economy with given world market prices (Erixon, 2000).

The RMM is “both an economic and wage policy programme and a theory of wages, profits, inflation and growth” (Erixon, 2000). Attaining its four targets of full employment, growth, price stability and equity is only possible, if the means described above are applied simultaneously. Only if all instruments - restrictive general economic policy, solidaristic wage policy, labour market policy and marginal employment subsidies – are allowed to cooperate, the implementation of the RMM will have overall positive effects and will counter-balance negative impacts, which a partial application of the model would undoubtedly have. For instance, restrictive economic policy and a solidaristic wage policy will lead to unemployment if they are not accompanied by complementary labour market policy measures. On the other hand, restrictive general economic policy in turn

is needed to curb the inflationary effects of labour market policy measures. Furthermore, only the synchronous use of all instruments ensures that they can work effectively, e.g. labour market policy measures and a restrictive economic policy must sustain a solidaristic wage policy in order to control wage disparities. If the RMM is implemented the way its authors designed it, then not only full employment and price stability would be achieved, but also growth and equity.

The structural change, i.e. eliminating least profitable companies and industries, enhance raising average productivity. More profitable companies gaining a larger share of the profits, can invest their extra profit in establishing new companies in dynamic sectors, thus realising further technical progress and applying more capital-intensive techniques. When the profit differences between low- and high-profitable sectors become larger, the incentives to shift resources from the former to the latter become stronger, and employees will then be relocated from low-productivity to expanding companies with relatively high productivity (Lundberg, 1996).

As to equity aspects, redistribution of income through solidaristic wage policy and marginal employment subsidies influence the functional distribution of income and thus result in a more eual distribution of personal income and wealth. (ibid.) By increasing labour mobility, labour market policies contribute to the reduction of significant wage differences between sectors. By creating full employment they can also amend the functional distribution of income to the benefit of labour and, consequently, raise the wage earners' share of value added (Erixon, 2000).

Combining full employment and growth with price stability and equity is undoubtedly irresistible to every economy, and especially so to a country which embodies the concept of the Scandinavian Welfare State. Sweden, of course, did implement the RMM – successful at first, but after the first oil crisis, it started

abandoning it, because the RMM did not prove to be capable to cope with the immense problems arousing from the subsequent recession.[7]

2.4 Brief summary of the macroeconomic developments in the Nordic EU-countries

The three EU-Scandinavian countries being analysed in this study – Sweden, Finland and Denmark – all belong the Scandinavian welfare state model. They all strive for equality, in view of social circumstances in general and of income and gender aspects in particular. A universal social security system, which includes generous unemployment benefits and access to extensive health care, as well as a labour market designed for achieving a maximum participation rate both contribute enormously to the public consent that the state and its authorities are to a large degree socially liable not only with respect to the civil society, but also with reference to the market. Hence macroeconomic policies in EU-Scandinavia have focused on overcoming problematic economic situations as quickly as possible in order to maintain a prospering welfare state.

Whenever it was possible, the EU-Scandinavian countries have profited from the effects of automatic stabilisers, often enhancing them by countercyclical fiscal measures, as raising public expenditures and using fiscal stimuli during economic downturns, and stimulating private saving through tax increases or credit market tightening during economic upswings. After the recession in the early 1990s and in view of the advancing EMU, it became mandatory to consolidate the public finances, and it was chosen for a medium-term fiscal targeting framework, formulating the reduction of the public debt to GDP ratio as a target to be achieved over the cycle. This has allowed for the automatic stabilisers to work further on, and has reduced the necessity for fiscal constraints or cyclical expenditure pressures, so that countercyclical fiscal policy was still possible, while each of the three countries have managed to reduce the public debt

[7] For a detailed chronological description of the RMM's application in Sweden and the varying success, please see Erixon, 2000.

to GDP ratio substantially after the implementation of medium-term fiscal targets.

The EU-Scandinavian financial markets were deregulated in the mid-1980s, but this has not had the same effects in each of the three countries. Denmark, where the deregulation was accompanied by a prudential supervision, disclosure rules and a tightening of the already strict capital adequacy standards, did not experience a subsequent economic boom phase, but it still was the country that was least affected by the recession of the early 1990s. In Sweden and Finland this recession was largely aggravated by the capital market deregulation, as these countries profited from the following credit expansion and the vast increase in domestic demand, without being able to curb the overheating and successfully fight the arising inflationary pressures. Hence, it were Sweden and Finland who had to cope with a massive banking crisis in the early 1990s.

Out of the three, Finland was the country to be affected worst by the early 1990s recession (also because of the sudden and sharp decline in the bilateral trade with the Soviet Union after the latter's collapse in 1991) and the entailing banking crisis, but it also was the fastest to recover from it. In contrast to Sweden and Denmark, where the economic recovery was based on an increase in domestic demand, Finland emphasized the opening of its economy to foreign ownership and a structural change towards the ICT-sector, both inducing an export-led economic growth. However, the excellent performance of the ICT-sector has only had negligible spillover effects on employment and domestic demand, and Finland's strong economic growth after the recession could not reduce unemployment.

As for monetary policy, Sweden, Finland and Denmark all used appreciations and depreciations of their currency in order to ensure competitiveness and to induce economic recovery. Denmark was the first to give up on active exchange rate policy and joined the ERM in 1982 (and the ERM II in 1999, when the outcome of the referendum was against the adoption of the euro). Since then, it has put the emphasis on fiscal measures when it came to issues of competitiveness and economic development. In view of the deep recession, Finland

and Sweden abandoned their fixed exchange rates in late 1992 and allowed their currencies to float, later pegging them to the ECU (with Finland joining the ERM in 1996). The target of full employment, which had dominated macroeonomic policies before, was given up in favour of the target of price stability. Sweden did so officially in 1993 after the floating of the Swedish krona had been terminated and, since then, Swedish monetary policy has been based on an inflation target of 2% per year, which was also due to the fact that Sweden wanted to keep an open door for the EMU joining in 1999. Denmark and Finland, too, have put a stronger emphasis on a low inflation rate, in order to be able to join the EMU in the future. Until today, each of the three countries uses inflation targeting and complies with the deficit and inflation targets given by the Maastricht treaty, although only Finland has become a member of the EMU, so far.

As the Scandinavian welfare state implies a considerable level of public expenditures, the aim in all three EU-Scandinavian countries was traditionally to achieve full employment, guaranteeing maximum possible tax revenues and thus funding generous social benefits and fiscal measures. ALMPs have played a major role when it comes to fighting unemployment and increasing the employment rate, although the intensity with which they have been applied varies, with Denmark (flexicurity model) and Sweden relying to a very large degree on ALMPs, and Finland only intensifying their use after the deep recession of the early 1990s, when the export-led growth did not prove to be able to reduce unemployment. Centralised wage bargaining also was a traditional feature of the EU-Scandinavian labour market, and Finland has maintained this form of wage negotiation until today (although it was not always possible to reach an agreement), while it was abandoned in Denmark in the late 1980s and finally in Sweden in 1990, whereas Sweden was gradually returning to that system in the course of the Rehnberg commission later in the 1990s.

The similarities as well as the differences in macroeconomic policies and features of Sweden, Finland and Denmark will be analysed in greater detail in the following econometric section of this study.

3 ECONOMETRIC ANALYSIS OF THE MACROECONOMIC REGIMES IN SWEDEN, FINLAND AND DENMARK

In this part, we analyse the main areas of economic policy in the Scandinavian countries Sweden, Finland and Denmark by means of an econometric analysis of their respective macroeconomic regimes during the time range from 1970q1 until 2006q4. The macroeconomic regime constellation, as introduced in chapter 1, describes the mutual interaction of fiscal, monetary and wage policy, in combination with the implications of the external economic environment. Taken as a whole, the macroeconomic regime constellation thus defines the overall orientation of the economic policy in a given country for a given period in time.[8] In contrast to the results obtained in mainstream neoclassical and 'new' endogenous growth theory models (see for example Solow, 1956, Grossman & Helpman, 1994, Romer, 1986, Romer, 1990, Romer, 1994, Lucas, 1988, Solow, 2000), the concept of a macroeconomic regime constellations thus implies a mutual dependence of the areas of macroeconomic policy, thereby assuming that macroeconomic policy has real effects. The growth performance of a country is then not wholly predetermined by external factors such as exogenous technological development, but can rather be influenced endogenously by adapting macroeconomic policy in the corresponding areas of the economy (see e.g. Kaldor, 1957, Kaldor, 1961, Robinson, 1956, Robinson, 1962, Hein, 2006)[9]

Here we concentrate our analyse of the macroeconomic regimes in the Scandinavian countries on the cyclical effects of economic policy over the course of the business cycle, since we hypothesise that macroeconomic policy in Scandinavia was allowed to act rather flexibly and could thus adapt to prevailing eco-

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[8] For a more extensive definition of macroeconomic regimes see Heine, Herr & Kaiser, 2006 and Hein, Menz & Truger, 2006 (2006).

nomic challenges that occurred in the short to medium run. The long-run growth effects of the welfare state in the Scandinavian countries then served as a confidence-building frame, within which macroeconomic policies were allowed to operate relatively freely. The impact of the welfare state on the long-run growth trend is analysed in the next section.

Our analysis of the macroeconomic regimes in the Scandinavian countries draws on Fritsche (2006) who conducted a similar investigation on distinct fields of macroeconomic policy of a series of Western industrialised countries. However, here we also take into account the mutual interaction of fiscal, monetary and wage policy and analyse their interdependencies and their concerted influence on the output, hence what we call macroeconomic regime constellation. The econometric analysis of the macroeconomic policy regimes in Sweden, Finland and Denmark is structured as follows.

First, we investigate *fiscal policy* in the Scandinavian countries by constructing a simple fiscal indicator, which enables us to identify periods of expansive or restrictive fiscal policy. With the aim of examining periods of countercyclical or pro-cyclical fiscal policy and of identifying structural breaks of the fiscal policy regimes, we furthermore employ simple and recursive correlation analysis between fiscal policy aggregates and the output gap.

The second chapter of this part deals with the econometric analysis of *monetary policy* in the Scandinavian countries. We first calculate a simple monetary indicator using the real interest rate as a measure of monetary policy and identifying restrictive or expansive periods over the span of time covered in our analysis. Finally we will proceed to estimate forward-looking Taylor rules in state-space models. By doing so, we can discover the underlying importance of each variable in the Taylor rule for the explanation of the nominal interest rate at each data point. We thus obtain insights concerning restrictive and expansive periods

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[9] Macroeconomic policies were found to be significant determinants of unemployment differences between countries in Baker, Glyn, Howell & Schmitt, 2005 and Palley, 2006. Hein & Truger, 2004 and Fritsche, Heine, Herr, Horn & Kaiser, 2004 apply the concept of interdependent economic policy and its consequences for the economic growth performance to the EMU and the USA, respectively.

in monetary policy as well as the relative importance of each variable in the Taylor rule at every point in time. We estimate Taylor rules including expected inflation, the output gap, and the nominal effective exchange rate as explanatory variables.

The third chapter of this part is dedicated to the analysis of *wage policy* in the Scandinavian countries. In order to examine whether wage policy was stability-oriented, we calculate a simple wage indicator and analyse periods with wage increases above or below the stability-norm. With the aim of discriminating wage-induced price inflation and price inflation due to exogenous price shocks, we then estimate a wage-price system with a state-space model for the Scandinavian countries. By doing so, we obtain the time-varying shocks to wage increases and the remaining external price shocks.

Finally, the fourth chapter of this part is dedicated to the investigation of the effect of the *mutual interaction of the areas of macroeconomic policy*, or what we term *macroeconomic regime constellation,* represented by the policy indicators calculated before, on the growth of real GDP. We attempt to solve this question with the estimation of a vector-autoregressive (VAR) system. In order to control for the effect of exchange rate policy on the output gap, we augment the VAR additionally with the real effective exchange rate.

For our investigation, we used quarterly data for the time span 1970q1 to 2006q4. With a few exceptions, data was obtained from the OECD Economic Outlook No. 80 (OECD, 2007a) and the OECD Main Economic Indicators Database (OECD, 2007b) for Sweden, Finland and Denmark. If they were not available from the OECD, we drew on data from the 'International Financial Statistics' (IFS) database of the IMF (IMF, 2007). Data for government expenditure and government revenue for Denmark were taken from the MONA model of the Danish Nationalbank (Danish Nationalbanken, 2007).

3.1 Fiscal policy

We regard the main task of fiscal policy as stabilising the business cycle, i.e. reducing the volatility of the fluctuations in output over the course of the busi-

ness cycle. This can be achieved by the automatic stabilisers (for example social benefits in the case of unemployment, progressive income tax etc.), by discretionary fiscal policy aiming at securing internal demand during recessions, or by a combination of both instruments. In order to remain sustainable, fiscal policy should act countercyclical and thus preserve a balanced budget over the course of the business cycle. This also implies that automatic stabilisers, on the one hand, and discretionary fiscal policy, on the other hand, should always operate in the same direction.

In this chapter, we first establish a simple fiscal indicator, which enables us to identify periods of expansive and restrictive fiscal policy.

Second, the direction of the fiscal policy in the Scandinavian countries Sweden, Finland and Denmark is analysed by means of a correlation analysis between the de-trended fiscal indicator, established in the first section of this chapter, on the one hand, and de-trended output as a measure of the business cycle, on the other hand. Due to the restricted data availability, we were only able to conduct our investigation of fiscal policy in Denmark from 1980q1 until 2006q4.

3.1.1 The fiscal indicator

Both government expenditure and government revenue contribute to diminishing the fluctuations of output over the business cycle: Ideally, government expenditure grows with a constant trend, implying slower growth than the output during upturns and slower reduction than the output during downturns. In contrast, government revenue should fluctuate stronger than output over the business cycle, thereby stabilising demand over the course of the cycle. We can thus construct a *fiscal indicator* by calculating the difference between cyclical government expenditure and cyclical government revenue, both in percent of GDP, to obtain the fiscal demand impulse in relation to the output:

(1) $$\text{fiscal} - \text{indicator}_t = \frac{(GE_t^{r-cycl} - GR_t^{r-cycl})}{y_t^r} 100$$

Values of the fiscal indicator above zero show periods of expansive fiscal policy, while negative values of the indicator point to periods of restrictive fiscal policy.

In order to obtain the cyclical components of output, government expenditure and government revenue, respectively, we first de-trended the data using a Hodrick-Prescott filter (Hodrick & Prescott, 1997) for government expenditure as well as government revenue (both deflated by the GDP-deflator), and an asymmetric band-pass filter (Baxter & King, 1995, Christiano & Fitzgerald, 2003) for real GDP as a measure of output. Generally, both filters are suitable for extracting the trend component (defined as fluctuations that have amplitudes exceeding eight years) of time series. We employed those filters that gave the most plausible results with respect to the data. The cyclical development of real output as well as real government expenditure and revenue was then obtained by subtracting the trend from the time series. Thereafter, we estimated the fiscal indicator as the difference of cyclical government expenditure and cyclical government revenue (both in percent of GDP) as in equation (1). Figure 3-1 shows the fiscal indicator for Sweden and Finland from 1970q1 until 2006q4 as well as the fiscal indicator for Denmark from 1980q1 and 2006q4.

Figure 3-1: Fiscal Indicator for Nordic EU-countries

(cf. Appendix B, p. 171)

The comparison of the fiscal indicators of EU-Scandinavia reveals three striking similarities at the end of the time series that is closest to the present: Going backwards chronologically we find expansive fiscal impulses in all three Nordic EU-countries in the first half of the 2000s, succeeding a common “restrictive peak” of the fiscal indicator in 2000, which could be interpreted as the final turning point of a restrictive trend, starting in 1993. Following this perception would hint at common features of the fiscal policy regimes in the countries observed: a major influence of the EMS-crisis in 1992/93 and of the preceding preparation of EMU start in 1999 (despite only Finland joined the euro area yet), an underestimation of demand contraction due to the burst of the “new economy”-bubble in 2000 and, finally a surprisingly pronounced expansive fiscal demand impulse in times of the Stability and Growth Pact (SGP) governing the fiscal policy in the EU of the early 2000s.

In contrast to these similarities we have to consider some differences in the fiscal policies ot the three Nordic EU-countries as well: First of all, in the time period comparable fiscal policy in *Denmark* seems to have followed a pattern that differs significantly from the ones in Sweden and Finland.[10] This divergence might have started sometime or other in the early 1980s and ended with the common restrictive peak in 2000. The fiscal indicator suggests the beginning of the 1980s in Denmark was dominated by expansive fiscal policies that were caused by high unemployment and high fiscal deficits after the second oil crisis. Around 1986 and in contrast to Sweden and Finland at that time, the indicator points to a sudden restrictive peak. For the time following and most of the 1990s, the indicator implies rather neutral fiscal policies, with an expansive period standing out in 1993 due to an income tax cut. From 1998 until 2001, however, a period of restrictive fiscal policies can be observed, which reflects the higher tax burden with the implementation of the Whitsun package in 1998. The indicator suggests that this was followed by a more extended period of expansive fiscal policies, representing Danish tax freezes and cuts in labour income taxes in response to the crisis in 2001. Finally, around 2005 the indicator once more points to restrictive fiscal policies.

In contrast to Denmark, the Swedish and Finnish fiscal policy has two outstanding demand peaks in common: a very restrictive one around 1990 and a very expansive in 1993. The restrictive peak in 1990 seemingly was the turning point ending distinct restrictive periods of fiscal policy, which started in Sweden already in 1986 and in Finland in 1988. Considered together with the developments of the Danish fiscal policy we could suppose an important trigger of the regime shifts of fiscal policy around the year 1985.

Finally, it should be mentioned that Sweden and Finland showed distinct periods of restrictive fiscal policy, 1976/77, after the first oil shock. In contrast to that Sweden reacted to the second oil shock (1979-1980) already in 1979 with an-

[10] Due to the different sources for our data, compared to the fiscal indicators for Sweden and Finland, the fiscal indicator for Denmark exhibits a less smooth pattern, which is however, not due to seasonal changes in the data.

other rather restrictive fiscal impulse before shifting to an expansive policy in 1980, while Finland turned to a restrictive policy only 1981, after an expansive impulse in 1978/79.

3.1.2 Correlation analysis of fiscal policy aggregates and output: How strong were the overall countercyclical patterns?

With the aim of determining whether fiscal policy in the Scandinavian countries acted counter- or pro-cyclically, we calculated the correlation between the fiscal indicator, on the one hand, and the output gap[11] on the other hand. With countercyclical fiscal policy, we generally expect cyclical government expenditure to be correlated negatively to the output gap, while cyclical government revenue should be correlated positively to the output gap. Considered as evindence of countercyclical fiscal policy, the fiscal indicator calculated in the preceding section should be correlated negatively to the output gap over the business cycle (see also Fritsche, 2006).

Figure 3-2: Correlation between fiscal indicators and output gaps in EU-Scandinavia

(cf. Appendix B, p. 172)

Considering the correlation between the fiscal indicator and the output gap in Sweden, we find a negative albeit weak correlation[12], supporting the suggestion of an overall countercyclical fiscal policy in Sweden. As a consequence of the weak correlation between the government finance aggregates and the output gap, the correlation between the fiscal impulse and the output gap is also found to be quite weak. The correlation between the fiscal indicator and the output gap in Finland also shows the expected negative sign. Although some of the data points in the scatter plot are still relatively widely dispersed, the negative correlation is more pronounced than in the case of Sweden. This is probably

[11] We define the output gap as the difference of real GDP and its trend obtained by the band-pass filter in percent of real GDP. It is thus the production above or below trend at any given time, which we use here as an indicator for booms and recessions, respectively.

due to a stronger negative correlation between government expenditure and the output gap. In sum, thus, our results point to a countercyclical fiscal policy in Finland over the time span covered here, which seems to be more distinct than in Sweden. The result for Denmark is very preliminary and there is substantial reason to be cautious in its interpretation, since some of the correlations are very weak and close to zero. The correlation between the fiscal indicator and the output gap is found to be negative, pointing to countercyclical fiscal policy, but also likely not very significantly so. Probably due to the hardly detectable negative correlation between government expenditure and the output gap, we thus can sum up that at a first glance, compared to Sweden and Finland, there seems to be a less pronounced countercyclical orientation of fiscal policy in Denmark.

3.1.3 Tests of structural breaks of the fiscal policy regimes: Are there any regime shifts?

While we have determined the general direction of fiscal policy in the Scandinavian countries employing simple correlation analysis, it remains to *test for structural breaks* in the relationship between fiscal policy and output over the course of the business cycle. We therefore estimated recursive correlation coefficients to test for structural breaks as in Fritsche (2006):

Recursive forwards estimated coefficients start with 20 data points (5 years) at the beginning of the sample, then add one data point and estimate the correlation coefficient again. This is being repeated until the end of the sample period. Using this estimation method, structural breaks at the beginning of the span of time covered in the analysis become more apparent than those at the end of the period, since as the sample increases, the earlier observations gain increasingly more weight in the estimation.

In contrast, *recursive backwards estimated correlation coefficients* start the estimation with the last 20 data points of the sample and then successively add

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[12] This is obvious from the widely dispersed data points in the scatter plot, which are relatively far from the regression line and follow no readily obvious trend.

another data point until the beginning of the time span is reached. Obviously, by employing this estimation method, structural breaks towards the end of the sample period are more distinctly pronounced than those at the beginning.

Finally, correlation coefficients estimated with a '*rolling regression*' estimate the correlation with a window of 32 data points (8 years), which is 'rolled' over the time span of the analysis. These coefficients are more sensitive to small changes in the data structure, since a new window may change the relationship significantly. Therefore, it is regarded as most insightful to interpret all recursive coefficients jointly. Generally, correlation coefficients below zero for the correlation between the fiscal indicator and output imply a countercyclical fiscal policy. Outliers with the opposite sign thus suggest a period of pro-cyclical fiscal policy.

Figure 3-3: Structural breaks of the fiscal indicators in EU-Scandinavia

(cf. Appendix B, p. 173)

Considering the recursive correlation coefficients for the correlation between the *fiscal indicator* and the output gap in Figure 3-3, we find that both recursive estimated coefficients in Sweden remain below the zero line throughout the whole time span, which confirms our assumption of a generally countercyclical fiscal policy. The rolling correlation coefficients indicates two structural breaks in the fiscal policy of Sweden with a positive correlation between the fiscal indicator and the output gap, one around 1985 (tight fiscal policies after the devaluations) and one in the second half of the 1990s (introduction of the nominal expenditure ceiling for government expenditures). Since the pro-cyclical periods are rather short and seemingly not very pronounced, they are probably not dominant enough to be represented fully in the recursive estimates. The countercyclical fiscal policy in Sweden, however, seems to have been most dominant in the first half of the 1990s (fiscal expansion in the crisis of the early 1990s) and after 2000 (fiscal expansion in response to the crisis in 2001 and consequent fiscal surplus after the recovery).

When analysing the correlation coefficients for the relationship between the *fiscal indicator* and the output gap, the picture for Finland turns out to be quite a different one from the one for Sweden: The recursive forwards estimated corre-

lation coefficients suggest a pro-cyclical or neutral fiscal policy in Finland throughout the 1970s and the first half of the 1980s. After 1986, however, the recursive forwards estimated coefficients turn significantly negative, thereby indicating a countercyclical fiscal policy in Finland from this date onwards. The rolling correlation coefficients suggest a positive correlation between the fiscal indicator and the output gap, and thus pro-cyclical fiscal policies, in Finland during the second half of the 1970s (expansionary fiscal policy with booming economy) and show a bump which reaches the zero line around 1997 (restrictive fiscal policies after the crisis of the 1990s along with laggard growth in the non-export sectors). On the other hand, between 1985 and 1995 countercyclical fiscal policy in Finland (fiscal tightening in order to dampen the overheating economy before 1990 and working automatic stabilisers after the crisis) seems to have been very distinct, with rolling correlation coefficients near –1. After 1997, the rolling regression indicates another countercyclical orientation.

The recursive estimated correlation coefficients for the correlation between the fiscal indicator and the output gap reinforce our assumption of generally countercyclical fiscal policies in Denmark as both remain firmly below the zero line. Both show a structural break around 1987 (‘potato diet’, reduction of employers’ social security contributions and increase in effective VAT). The rolling correlation coefficients detect a major change in the correlation between the fiscal indicator and the output gap around 1992, with positive correlation coefficients displayed between 1990 and 1993 suggesting pro-cyclical fiscal policy in those years. This could point at the combination of slow growth due to the crisis at the beginning of the 1990s in Denmark and the implementation of the EU-initiated debt ceilings and deficit targets at the same time.

3.1.4 Preliminary summary of the results

One common feature of all three countries of EU-Scandinavia is a significant countercyclical orientation of the fiscal policy regimes after 2000. For the period before this date, we could detect structural breaks of the fiscal polices in Sweden and Finland in 1985 and 1995, while Denmark has followeda distinct fiscal policy regime since the early 1980s.

An overall summary of our results with regard to fiscal policies in the Scandinavian countries Sweden, Finland and Denmark indicates that each of the three countries show cyclical changes between expansive and restrictive fiscal policies over the relevant time span that generally follow a countercyclical pattern. We therefore conclude that the principal task of fiscal policy we had defined as the stabilisation of the business cycle was generally accomplished.

However, we also identified various periods of pro-cyclical fiscal policy in each country: Sweden seems to have employed pro-cyclical fiscal policies in response to restrictive shocks such as the devaluations in the 1980s and the introduction of the nominal expenditure ceiling for its government in the second half of the 1990s after the crisis at the beginning of the 1990s. In contrast, the period of pro-cyclical fiscal policy we observe in Finland in the 1970s up to the first half of the 1980s, seems to have arisen from expansive fiscal policies in a period of booming economic activity. However, the deep economic crisis at the beginning of the 1990s ensued restrictive fiscal policies in the second half of the 1990s also in Finland. In Denmark, a short period of pro-cyclical fiscal policy is suggested at the beginning of the 1990s probably related to the implementation of EU-initiated fiscal rules when growth still suffered from the crisis.

3.2 Monetary policy

It is widely acknowledged that the principal task of monetary policy the maintenance of price stability. However, we also regard it as an important task of the central bank to encourage the growth of real output over the business cycle, thus allowing a certain degree of price inflation which enhances the economic climate for growth. Therefore, the inflation target must not be set too low so as to avoid a situation where deflation might occur.

In this chapter we first calculate a simple indicator of monetary policy in Sweden, Finland and Denmark, making use of the real interest rate, since it is assumed that the central banks target a certain real interest rate. We then enhance our analysis of monetary policy by estimating various Taylor rules of monetary policy in the Scandinavian countries with state-space models. Thereby, we are able to extract the unobservable, stochastic characteristics of

the variables determining the nominal interest rate in the Taylor rule. This enables us to generate time-varying coefficients that measure the importance of the exogenous variables in the Taylor rule for the explanation of the nominal interest rate at any given moment within covered the span of time.

3.2.1 The de-trended real interest rate as an indicator of monetary policy

With the aim of analysing the monetary policy in the Scandinavian countries since 1970, we calculated the real interest rate as an indicator of monetary policy. It is assumed that the central bank sets its key interest rate according to a targeted short-run real interest rate. Insofar as price rigidities exist, it is understood that the central bank can influence the real interest rate, at least in the short run.[13] The real interest rate was taken as the appropriate indicator of the direction of monetary policy, since it is assumed that the real interest rate influences investment expenditures and consumption.

We further assume that investment and consumption decisions are forward-looking, which means that they are calculated with the expected real interest rate, rather than the present one. Therefore, we took the core rate of inflation, i.e. excluding price changes for food and energy, as a proxy of the inflation expectations to calculate the expected real short-run interest rate (as in Fritsche, 2006). In order to calculate the cyclical real inflation rate as a normative indicator of monetary policy during the business cycle, i.e. our *monetary indicator*, we employed a Hodrick-Prescott filter ((Hodrick & Prescott, 1997)) to the time series.[14] We thus allowed for a time-varying trend in the short-run real interest rate and defined our indicator the direction of monetary policy over the business cycle as the cyclical real interest rate:

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[13] See for example Bernanke & Gertler, 1995, Clarida, Galí & Gertler, 1998, Clarida, Galí & Gertler, 1999, Clarida, Galí & Gertler, 2000 and Bagliano & Favero, 1998. For different theoretical explanations of wage and price rigidities and stickiness due to non-rational expectations see Akerlof, Dickens & Perry, 1996, Akerlof, Dickens & Perry, 2000, Mankiw & Reis, 2002 and Carroll, 2003.

[14] The filter was chosen according to the plausibility of the results.

(2) $$\text{monetary} - \text{indicator}_t = i_t^r - i_t^{r-\text{trend}} = i_t^{r-\text{cycle}}$$

Positive values of the monetary indicator then imply a real short-run interest rate above the expected value, suggesting that monetary policy tightened in this period. Alternatively, negative values of the indicator suggest an expansive monetary policy with a short-run real interest rate below the expected value.

Figure 3-4: Monetary Indicators for the Nordic EU-countries

(cf. Appendix B, p. 174)

Comparing the monetary indicators for EU-Scandinavia we find some striking similarities as well: First, we observe an expansive monetary policy as common reaction to the first oil price shock in 1974/75. Second, we identify severe restrictive monetary episodes in all three Nordic EU-countries during the EMS-crisis in 1992/93, and third, a remarkable stabilisation of monetary policy after the blow-up of EMS-1 (with one significant restrictive outlier in the case of Denmark in the year 2000). These results substantiate our assumption that the EMS-crisis probably triggered an important regime shift in macroeconomic policy, at least in Sweden and Finland.

Again and in comparison, the Danish monetary policy showed a more stable pattern already before the EMS-crisis, at least since the mid-1980s.This was probably due to fact that Denmark as EU-country (since 1973) was a genuine member of the EMS. In 1986, the EMS switched to a policy, in effect using the Deutschmark as an anchor for the ERM (actually the EMS without the UK, which decided not to join the ERM until October 1990, and to withdraw from it as soon as September 1992). As a consequence of the simultaneous introduction of full capital mobility in preparation of the Single European Market to be completed in 1992, all members of the ERM, including Denmark, lost their capability to execute a monetary policy independent of the decisions of the German central bank. Interestingly, it were the Danes, who voted against the ratification of the Maastricht treaty with the transition of the EMS into the EMU as one of its core elements, thus triggering the open crisis of the EMS in the summer of 1992. This consequence was due to the provision of the Treaty stating that it, including the ambitious EMU-project, would be void unless ratified by all

EU countries. The succeeding speculative attacks against Lira and Pound as well as the decision of the German central bank to stop unlimited interventions in favor of the narrow band of the currency parities result in the withdrawal of the Italian and British currencies from the ERM in mid-September 1992. Speculation shifted to the currencies of Ireland, Spain, Portugal, and even to currencies of countries like Belgium, Denmark and France, with inflation rates below the (relatively high) German level. Finally, the crisis was not resolved before the EU monetary authorities adopted a new ultra-large band of fluctuations for the ERM, which de-facto hardly differed from a floating exchange rate regime. The granting of opt-outs on the single currency (and in the case of Denmark on defence matters as well), after all, made it possible for the Maastricht Treaty to come into force in November 1993.

In contrast to Denmark, Sweden and Finland did not join the EU before 1995. Until their EU accession, they were free to conduct an independent monetary policy and to unilaterally peg or not to peg the ECU or another currency. This notwithstanding, these countries had decided to liberalise their capital accounts in the mid-1980s in order to meet the provisions of the Single European Market and the criteria for their own EU accession ten years later. Ironically the early member of EU and EMS, Denmark, paved the way for the Swedish opting-out on the single currency, while the new EU member country Finland directly joined EMS in 1995 and the Euro area in 1999.

Throughout the 1970s until the mid-1980s, the Swedish indicator shows a strong cyclical pattern, suggesting alternating expansive and restrictive monetary impulses without major shocks to monetary policy in Sweden. This can be explained by the active exchange rate policy employed throughout this period, which concentrated on maintaining full employment via exchange rate devaluations rather than stabilising the real exchange rate. In contrast, in 1991 the indicator demonstrates a strong negative outlier with an even stronger positive outlier afterwards, indicating a sudden monetary expansion followed immediately by a strong monetary tightening. The outliers represent the unilateral currency peg of the Swedish krona to the ECU in 1991, on the one hand, and the floating of the currency in 1992, on the other hand. After the monetary shock, the volatil-

ity of the monetary indicator decreases significantly, thus pointing at a considerable overall change in monetary policy after 1995. This can be interpreted as a decline in variability and shocks to inflation after the Swedish Riksbank implemented a formal inflation target in 1995 and succeeded in stabilising inflation around the target in the following years.

The de-trended short-run real interest rate of *Finland* as an indicator of Finnish monetary policy since 1970 reveals several periods of monetary tightening in Finland: There are two less strong restrictive episodes in the first and in the second half of the 1970s and two periods of rather strong monetary tightening from 1983 to 1987 (increasing pressure to dampen inflation after the capital market liberalisation) and from 1990 to 1993 (increased interest rates in order to defend the peg to the ECU before the floating in 1992). On the other hand, monetary expansions according to the de-trended real interest rate seem to have been most pronounced around 1975 (reflecting a devaluation after the first oil crisis) and preceding the crisis at the beginning of the 1990s.

Similar to our findings of monetary policy in Sweden, the Danish indicator also reveals a pronounced cyclical pattern until 1982 owing to various devaluations of the Danish kroner, with a particularly strong monetary expansion around 1975 in response to the first oil shock. Between 1982 and 1985, the indicator points to a monetary expansion. For the second half of the 1980s the monetary indicator suggests a rather neutral monetary policy in Denmark. The indicator of Denmark points towards a strong monetary tightening in 1992/93, which was obviously supposed to defend the parities of the ERM against the speculative attacks on the Danish kroner. Again, we observe a much less active monetary policy after 1995 also in Denmark. However, the monetary indicator proceeds in a more volatile way than is the case for the Swedish and the Finnish indicator, with a monetary tightening indicated around 2000 before the failed referendum on the adoption of the euro. Thus, although Danish monetary policy has generally followed the course of the ECU/euro area ever since the country has joined the EMS, the Danish Nationalbank takes care to preserve its independence and makes sure this is acknowledged elsewhere.

3.2.2 Estimation of a Taylor rule with a state-space model

With the aim of obtaining additional insights on the direction of monetary policy and on the relative importance of various exogenous variables in the interest rate decisions of the Scandinavian central banks at any given moment, we estimated different Taylor rules in state-space models.

Taylor (Taylor, 1993) first defined a simple rule for monetary policy, where the nominal interest rate (i_t) that is set by the central bank is influenced by the long-run equilibrium real interest rate ($\bar{i}^r$), the current rate of inflation (π_t), the inflation gap ($\pi_t - \bar{\pi}$), and the output gap ($y_t - \bar{y}$):

$$i_t = \bar{i}^r + \pi_t + \alpha(\pi_t - \bar{\pi}) + \beta(y_t - \bar{y}). \tag{3}$$

Recent theoretical and empirical literature on monetary policy has, however, emphasised the importance of the deviation of expected inflation and output from their targeted values rather than their current or past gaps in determining the short-run nominal interest rate.[15] It is assumed that temporary nominal wage and price rigidities induce a positive relationship between output and inflation in the short run. In accordance with the current state of the economy, the central bank thus has a target for the short-run nominal interest rate that is set in line with the following rule:

$$i_t^* = \bar{i} + \delta[E_t(\pi_{t+k}|\Omega_t) - \bar{\pi}] + \gamma[E_t(y_t|\Omega_t) - \bar{y}], \tag{4}$$

where i_t^* is the targeted short-run nominal interest rate in period t, $\bar{i}$ denotes the long-run equilibrium nominal rate and $E_t(x_t|\Omega_t)$ is the expected value of variable x in period t, making use of the information set Ω available in period t.

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[15] Forward-looking Taylor rules are derived theoretically and estimated in a wide variety of papers, see Clarida, Galí & Gertler, 1998, Clarida, Galí & Gertler, 2000, Clarida, 2001, Kamps & Pierdzioch, 2002 and Fritsche, 2006 to name just a few. For a summary of recent monetary theory see Clarida, Galí & Gertler, 1999. The model estimated here follows Fritsche, 2006 and is essentially the same as the ones in Clarida, Galí & Gertler, 1998, Clarida, Galí & Gertler, 2000 and Kamps & Pierdzioch, 2002.

It is further understood that the central bank sets the short-run nominal interest rate so that the targeted rate is approached gradually. This procedure called 'interest rate smoothing' (Goodfriend, 1991) is usually employed in order to avoid capital market distortions, maintain credibility etc. The actual nominal interest rate thus follows a partial-adjustment model:

(5) $$i_t = (1-\rho)i_t^* + \rho(L)i_{t-1} + \nu_t ,$$

with 0<ρ<1 measuring the degree of interest rate smoothing and an i.i.d. shock to the interest rate, υ. Combining equations (4) and (5) and defining $\phi \equiv \bar{i} - \delta * \bar{\pi}$ and $y_t^{gap} \equiv y_t - \bar{y}$, we obtain

(6) $$i_t = (1-\rho)[\phi + \delta E_t(\pi_{t+k}|\Omega_t) + \gamma E_t(y_t^{gap}|\Omega_t)] + \rho(L)i_{t-1} + \nu_t .$$

For the estimation of the forward-looking Taylor rule in equation (6), we assumed the expected output gap in period t to equal the actual output gap in this period. Since the expected inflation rate between periods t and k constitutes a forward-looking variable that is unknown and thus correlated to the residual υ_t, we forecasted expected price inflation over the whole investigation period separately before estimating equation (6). This was achieved in a vector-autoregressive (VAR) model, where the inflation expectations of the central bank were taken to be formed by considering inflation itself, the short-run nominal interest rate, the output gap and the change in commodity prices. We proxied commodity prices with the change in energy prices, which were taken to be exogenous. All other variables were assumed to be endogenous and included with up to 8 lags (quarterly data). In order to avoid structural breaks in the model, we divided the sample period after analysing the system's residuals and estimated the VARs for the following sub-samples: Sweden: 1st VAR 1973q1 – 1990q4, 2nd VAR 1991q1 2006q2; Finland: 1st VAR 1972q1 – 1992q4, 2nd VAR 1993q1 – 2006q4; Denmark: 1st VAR 1973q3 – 1989q4, 2nd 1990q1-2006q4. Differences with respect to the start and end dates of the inflation forecast are due to the availability of data. With the VAR model, we then generated inflation forecasts with a horizon of four quarters (assuming a constant inflation regime for the estimation period of the model), which we employed as the time

series of expected inflation in equation (6). Generally, the forecasted time series of expected inflation matches actual inflation in the three Scandinavian countries quite closely.[16]

Modeling the forward-looking Taylor rule in a state-space model enables us to estimate the unobservable, stochastic processes underlying the observable course of the data process. Hence, state-space analysis renders it possible to estimate the time-variant influence of the exogenous variables in the Taylor rule with respect to the nominal interest rate[17]:

(7) $$i_t = (1-\rho)[\phi + z_1 E_t(\pi_{t+k}) + z_2 y_t^{gap}] + \rho(L) i_{t-1} + \nu_t, \text{ with } \quad \nu_t \sim N(0, e^{\eta})$$

(8) $$z_{1t} = z_{1t-1} + \nu_{1t} \qquad \nu_{1t} \sim N(0, e^{\varphi})$$

(9) $$z_{2t} = z_{2t-1} + \nu_{2t} \qquad \nu_{2t} \sim N(0, e^{\kappa}).$$

The state-variables z_1 and z_2 are modeled as random walks and measure the time-variant influence of expected inflation and the output gap, respectively, on the short-run nominal interest rate. The state-space model hence allocates the state-variables the value that explains the nominal interest rate best at any given moment. It is therefore not necessary to test separately for structural breaks in order to detect changes in regime, but rather the state-variables themselves reveal any structural breaks in their importance for the interest rate decision of the central bank.

In order to control also for the influence of the nominal exchange rate for the setting of interest rates by the central bank, we estimated an augmented Taylor rule where the nominal effective exchange rate (NEER) was included:

(10) $$i_t = (1-\rho)[\phi + z_1 E_t(\pi_{t+k}) + z_2 y_t^{gap} + z_3 neer_t] + \rho(L) i_{t-1} + \nu_t, \qquad \nu_t \sim N(0, e^{\eta})$$

(11) $$z_{1t} = z_{1t-1} + \nu_{1t} \qquad \nu_{1t} \sim N(0, e^{\varphi})$$

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[16] See Figures A1-A3 and Tables A1-A6 in the appendix for the results of the VAR estimation of expected inflation.

[17] For an extensive description of state-space analysis methods see Hamilton, 1994 and especially Durbin & Koopman, 2001.

(12) $$z_{2t} = z_{2t-1} + \nu_{2t} \qquad \nu_{2t} \sim N(0, e^{\kappa})$$

(13) $$z_{3t} = z_{3t-1} + \nu_{3t} \qquad \nu_{3t} \sim N(0, e^{\tau}).$$

The state-space estimation of the Taylor rule including the nominal effective exchange rate for Sweden gave way to the following coefficients (standard errors are in parentheses)[18]:

(10a) $$i_t = (1 - \underset{(0.020)}{0.410})[\underset{(0.224)}{4.267} + z_1 E_t(\pi_{t+k}) + z_2 y_t^{gap} + z_3 neer_t] + \underset{(0.020)}{0.410}\, i_{t-1} + \nu_t$$

Figure 3-5: Time-varying coefficients of expected inflation, output gap and nominal effective exchange rate in a Taylor-rule for Sweden

(cf. Appendix B, p. 175)

Our estimates of the time-varying state-variables of the augmented Taylor rule according to equation (10) for Sweden are presented in Figure 3-5. The influence of expected inflation and the output gap, respectively, on the short-run nominal interest rate is depicted by z1 and z2. We observe the effect of increased inflation expectations due to the currency depreciations in the middle of the 1980s and due to the currency crisis in the first half of the 1990s with values of z1 significantly above 1. The structural break in z1 is also shown very clearly, albeit not until 1999 when inflation expectations had already stabilised. The time-varying influence of the output gap is estimated to be insignificant before 1991, negative between 1991 and 1995 and significantly positive after 1998. The state-variable z3 finally depicts the influence of the nominal effective exchange rate (NEER) on the nominal interest rate. It is clearly visible that during the period of fixed exchange rates before 1992, z3 shows a much more volatile course, which is also reflected in the larger significance bands. Positive peaks indicate depreciations at the beginning of the 1980s and an appreciation in the

[18] Again, some of the variances of the signal and the state equations had to be restricted in order to obtain stable results: $\nu_t \sim N(0,0.0)$, $\nu_{1t} \sim N(0,0.01)$ and $\nu_{2t} \sim N(0,0.0)$. υ_{3t} was estimated to be $\nu_{3t} \sim N(0, e^{\underset{(0.094)}{0.958}})$. The covariances between υ_t and υ_{1t}, on the one hand, and between υ_t and υ_{3t}, on the other hand, were restricted to 0.01 and 0.0, respectively. The covariance between υ_t and υ_{2t} was estimated to be -0.062 (0.007).

second half of the 1980s, whereas a negative outlier points to the depreciation in 1992 after the floating of the Swedish krona. After 1992, the influence of the NEER on the nominal interest rate is shown to have stabilised significantly.

The state-space estimation of the Taylor rule including the NEER for Finland yielded the following coefficients (standard errors are in parentheses)[19]:

(10b) $$i_t = (1 - \underset{(0.046)}{0.215})[\underset{(1.879)}{5.193} + z_1 E_t(\pi_{t+k}) + z_2 y_t^{gap} + z_3 neer_t] + \underset{(0.046)}{0.215} i_{t-1} + \nu_t .$$

Figure 3-6: Time-varying coefficients of expected inflation, output gap and nominal effective exchange rate in a Taylor-rule for Finland

(cf. Appendix B, p. 176)

The estimated time-varying coefficients of the exchange-rate-augmented Taylor rule for Finland are presented in Figure 3-6. The peaks indicate a strong restrictive influence of expected inflation on the nominal interest rate around 1986 and between 1990 and 1992. , The structural break in 1995 is also obvious. The time-varying coefficient of the output gap is found to be strongly insignificant before 1985. Afterwards, the coefficient alters between positive and insignificant values and becomes negative after 2002. The z2 variable thus suggests that monetary policy only took account of the real economy after the stabilisation of inflation expectations, however, time-varying coefficients for the output gap remain small. The z3 variable, depicting the time-varying influence of the nominal effective exchange rate, seems to be insignificant for most of the sample period. Nevertheless, it is obvious that the variance of z3 has decreased substantially after 1993. Positive peaks of z3, indicating depreciations in Finland and thus restrictive impacts on the nominal interest rate, are suggested around 1986 and between 1990 and 1991. These coincide with the monetary tightenings indicated by z1 and a speculative attack against the Finnish markka along with the

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[19] Again, we had to restrict some of the variances, leading us to set $\nu_{1t} \sim N(0,0.5)$ and $\nu_{2t} \sim N(0,0.0)$. u_t and u_{3t} were estimated to be $\nu_t \sim N(0, e^{\underset{(0.095)}{-0.903}})$ and $\nu_{3t} \sim N(0, e^{\underset{(0.075)}{-0.624}})$, respectively. Finally, the covariances between u_t and u_{1t}, between u_t and $u_{2t,}$ and between u_t and u_{3t} were estimated to be 0.471 ($3.82e^{-5}$), 0.158 (0.003) and 0.223 (0.016), respectively.

liberalisation of the capital markets, as well as the devaluation after the floating of the markka during the currency crisis in the early 1990s. After 1995, z3 shows a close to zero influence of the NEER on the nominal interest rate which can be interpreted as the loss of the exchange rate instrument in monetary policy after the Finnish accession to the EMU was initiated.

The state-space model estimation for the Taylor rule including the nominal effective exchange rate for Denmark gave way to the following coefficients (standard errors are in parentheses)[20]:

(10c) $$i_t = (1 - \underset{(0.004)}{0.619})[\underset{(0.166)}{7.727} + z_1 E_t(\pi_{t+k}) + z_2 y_t^{gap} + z_3 neer_t] + \underset{(0.004)}{0.619}\, i_{t-1} + \nu_t$$

Figure 3-7: Time-varying coefficients of expected inflation, output gap and nominal effective exchange rate in a Taylor-rule for Denmark

(cf. Appendix B, p. 177)

The time-varying coefficients of the NEER-augmented Taylor rule in Denmark are shown in Figure 3-7. We observe mostly insignificant values of z1 until the beginning of the 1990s. The monetary tightening in 1987 and 1990 with values close to or above 1 due to increased inflation expectations during the 'potato diet' and the crisis at the beginning of the 1990s are also visible in the augmented Taylor rule estimation, and z1 values suggest that only the second tightening is significant. The structural break in 1993, with a strong positive outlier of z1 indicating a very restrictive impact of expected inflation followed by equally strong negative values of z1 reflecting the speculative attack on the Danish kroner and the subsequent monetary expansion, is also clearly depicted. After the structural break, we again observe negative values of z1, pointing at statistical problems as mentioned above. The time-varying coefficient of the output gap here is found to be largely insignificant, with a positive peak around 1993,

reflecting the implementation of the medium-term fiscal framework. Finally, the nominal effective exchange rate seems to have been largely neglected in the Danish Nationalbank's exchange rate decisions which is not a surprising result considering the implementation of a fixed exchange rate regime as early as 1982. Before 1990 we do not find any significant influence of the exchange rate on the central bank's interest rate setting. Between 1990 and 1992, the state-variable z3 shows very small positive values, which are reversed to negative values after 1997, albeit hardly reaching values under –1. The small values of z3 reflect the fact that the Danish kroner never surpassed its fluctuation range of 2.25% against the ECU and the euro, respectively.

3.2.3. Preliminary summary of the results

The analysis of monetary policy in Sweden, Finland and Denmark revealed some interesting insights with respect to its achievement of price stability, monetary disturbances and the role of expected inflation. We generally observe a distinct stabilisation of monetary policy in each of the three countries after 1995, which in Denmark seems to have been achieved around 1985 already. Various factors can be mentioned as causes for the increased price stability, but the most prominent reason for the decline in monetary shocks and the consequent stabilisation of inflation expectations seems to have been the introduction of an inflation target regime in Sweden and Finland after the devaluations during the EMS crisis in 1992/93. In the case of Denmark, the EMS membership combined with a transparent monetary system were flexible enough to react to domestic challenges to price stability and growth, and ensured a stable monetary environment as early as the 1980s thus avoiding the banking and currency crisis at the beginning of the 1990s.

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[20] Again, we had to restrict the sample period to 1984q1 until 2005q1 and the variances of all the signal and state equations to $\nu_t \sim N(0,0.01)$, $\nu_{1t} \sim N(0,0.10)$, $\nu_{2t} \sim N(0,0.0)$ and $\nu_{3t} \sim N(0,0.0)$ in order to ensure the stability of the model. The covariances between υ_t and υ_{2t} as well as between υ_t and υ_{3t} were restricted to 0.0 and 0.01, respectively. Finally, the covariance between υ_t and υ_{1t} was estimated to be –0.639 (0.007).

3.3 Wage policy

In the macroeconomic policy mix of a country, wage bargaining systems are assigned the task of coordinating wage increases. One the one hand, these must not be too high in order to avoid pressure on prices and price inflation. On the other hand, they should not be too low, either, because insufficient nominal wage increases imply real wage decreases, which would deprive the economy of private demand and thus entail the risk of price deflation.

If firms set prices with a mark-up (1+m) on nominal unit labour costs (W_n/λ), wages will be related to the price level according to the following equation:

(14) $$P = \frac{W_n}{\lambda}(1+m)$$, implying that

(15) $$\log(W_n) = \log(P) + \log(\lambda) - \log(1+m)\,.$$

Thus, assuming a constant mark-up, stability-oriented nominal wages should increase according to the formula

(16) $$\hat{W}_n = \pi + \hat{\lambda}\,,$$

where $\hat{W}_n$ stands for nominal wage increase, π for price inflation, and $\hat{\lambda}$ for the increase in productivity.[21] Since the macroeconomic price inflation is not immediately affected by wage policy, but depends on the pricing decisions of companies and external shocks, wage policy should generally be oriented at the targeted rate of inflation by the central bank. The same applies to developments in labour productivity, where wage policy should account for mid-term changes in trend productivity only. Equation (16) thus changes to equation (16a) (Fritsche, 2006):

(16a) $$\hat{W}_n = \pi^{target} + \hat{\lambda}^{trend}$$

[21] Hein, 2004, Hein, 2006, Arestis & Sawyer, 2005 and Sawyer, 2002, amongst others, additionally stress the importance of the influence of distribution conflicts on the nominal wage setting, especially when it comes to explaining persisting inflation. Since we are concerned with the short-run impacts of economic policy here, we will abstract from distributional conflicts.

We will analyse the wage bargaining policy in the Scandinavian countries Sweden, Finland and Denmark in this section by first estimating a wage indicator based on equation (16a). Due to the construction of our indicator, positive values indicate wage increases above the stability-oriented level, while negative values of the indicator point at wage raises below the ideal level.

In the second part of this section the question of the relationship between wage policy and monetary policy will be further pursued by discriminating between wage induced price inflation and inflation due to external shocks, such as oil price increases. This will be attempted by the estimation of a wage-price system in a state-space model.

3.3.1 Analysis of wage policy with a wage indicator

The wage indicator for the investigation of wage policy in the Scandinavian countries since 1970 was constructed according to the rule for stability-oriented wage policy in equation (16a):

(17) $$\text{wage} - \text{indicator}_t = \hat{\bar{W}}_{nt} - \pi_t^{target} - \hat{\lambda}_t^{trend}$$

Since time series for the targeted inflation rate by the central bank were not available for all the countries investigated in this study, we approximated the mid-term target of inflation with a backward-looking two-year moving average of the inflation rate represented by the change in the consumer price index, thus assuming adaptive expectations of the wage-setting parties.[22] The increase in trend productivity was calculated by extracting the trend of labour productivity growth with a Hodrick-Prescott filter ((Hodrick & Prescott, 1997)).

Figure 3-8: Wage Indicators for the Nordic EU-countries

(cf. Appendix B, p. 178)

[22] For different explanations of non-rational inflation expectations and evidence of adaptive inflation expectations see for example Akerlof, Dickens & Perry, 1996, Akerlof, Dickens & Perry, 2000, Mankiw & Reis, 2002, Staiger, Stock & Watson, 1997 and Carroll, 2003. We also estimated the wage indicator with the time series of expected inflation estimated with the VAR system in section 4.3.2 as a proxy for targeted inflation to check for robustness of the indicator and found that there was no significant difference between the two indicators.

Some common features of wage indicators for the Nordic EU-countries, as depicted in Figure 3-8, were, first, the excessive wage increases in the mid-1970s due to the misleading perception of the first oil price shock as an demand shock, second, some increases above a stability-oriented wage norm at the end of the 1980s, and, third, the stabilisation of the wage indicator from the mid-1990s onwards. The last point may reasonably be interpreted as closely related to the stabilisation of the monetary policy after the complete introduction of inflation-targeting regimes in all of the three Nordic EU-countries.

Considering the wage indicator for Sweden, we find negative values of the wage indicator for most of the periods from 1977 through 1985 suggest a decade of wage increases that were too low. This corresponds to the period of lower nominal wage raises due to the devaluations of the Swedish krona, on the one hand, and due to wage moderation, on the other hand. The deep crisis in Sweden in the early 1990s is also clearly visible in the wage indicator, which shows a period of too high nominal wage raises in the onset of the crisis, followed by a strong and prolonged period of negative values of the wage indicator when mid-term inflation was still high, but employment and wage increases were slow to pick up after the crisis. After 1997, however, wage policy in Sweden seems to have been quite stability-oriented, with the wage indicator fluctuating closely around the zero line.

As far as the wage policy in *Finland* since 1970, is concerned, the wage indicator suggests that the period of overshooting wages in the mid-1970s was followed by a period of wage increases considerably below the stability-oriented level from the mid 1970s until the end of the decade. During this period, wage increases deviated the strongest from the stability-oriented norm for the whole sample period. For the 1980s, the wage indicator alternates between positive and negative values. Very similar to our findings of the wage indicator for Sweden, the crisis at the beginning of the 1990s is also clearly visible in the negative values of the wage indicator for Finland, which can be attributed to relatively small wage increases and high mid-term inflation during the crisis. Even though the negative values persist for quite a long period, thereby indicating a prolonged crisis, they do not reach the strong negative values of the end-1970s.

After 1995, wage policy in Finland seems to have been largely stability-oriented, as was also indicated for Sweden. Since 2002, however, the wage indicator shows a rising trend which might point to an upward departure of wage increases from the stability-oriented wage policy norm.

After 1975, and in contrast to Sweden and Finland, the Danish wage indicator fluctuates around the zero line and shows a prolonged period of negative values from 1980 to 1987, when high unemployment and increased decentralisation of wage bargaining induced smaller nominal wage raises. The indicator suggests that the period of dismal macroeconomic performance with low nominal wage increases was followed by a short period of overshooting wage raises, when, after several years of wage moderation, nominal wage increases were settled generously. After the 1990s, the wage indicator for Denmark remains closely to the zero line, pointing to almost perfectly stability-oriented wage policies ever since.

3.3.2 Estimation of a wage-price system with a state-space model

While the wage indicator measures the deviation of actual increases in nominal wages from their 'ideal' increases defined in equation (16a), the indicator cannot discriminate between shocks to inflation that are due to nominal wage developments and shocks that are due to external price developments not directly related to nominal wages, such as oil prices, for instance. Therefore, we additionally estimated a wage-price system, which enables us to identify wage price shocks and external price shocks as the wage and price developments that are not in line with the theoretically derived model. The shocks are modeled as time-variant random walks in a state-space model and thus measure the underlying, stochastic processes at any given moment that are not captured by the variables of the wage and price equations.[23]

[23] For an extensive description of state-space analysis methods see Hamilton, 1994 and especially Durbin & Koopman, 2001.

We assume that wages increases are influenced by expected developments in labour productivity ($\hat{\lambda}^{e}$), expected inflation (π^{e}) and the unemployment gap ($u-\bar{u}$) (equation (18)). While prices are set by companies with a mark-up on unit-labour costs as in equation (14) and thus increase relative to nominal wage increases and expected increases in labour productivity (equation (20))[24]:

(18) $$\hat{W}_{nt} = c^{w} + \hat{\lambda}^{e}_{t} + \pi^{e}_{t} + f(u_{t} - \bar{u}) + z_{1t} + \upsilon^{w}_{t}, \text{with} \quad \nu^{w}_{t} \sim N(0, e^{\eta})$$

(19) $$z_{1t} = z_{1t-1} + \nu_{1t}, \quad \nu_{1t} \sim N(0, e^{\varphi}).$$

(20) $$\pi_{t} = c^{\pi} + \hat{W}_{nt} - \hat{\lambda}^{e}_{t} + z_{2t} + \upsilon^{\pi}_{t}, \text{ with} \quad \nu^{\pi}_{t} \sim N(0, e^{\psi})$$

(21) $$z_{2t} = z_{2t-1} + \nu_{2t}, \quad \nu_{2t} \sim N(0, e^{\kappa}).$$

The constant c^{w} in the wage equation (18) captures the average wage increases throughout the estimation period that can be interpreted as a measure of unions' bargaining power. The constant c^{π} in the price equation (20), though, captures average price increases that are independent of the development of unit labour costs and can thus be understood as companies' risk premium. Finally, the state-variables z1 and z2 measure those shocks to inflation that cannot be attributed to the exogenous variables in equations (18) and (20). Hence, z1 accounts for wage inflation shocks at any given moment that are caused by deviations of wage increases from their stability-oriented levels. If z1 displays positive values, wage increases were too high, if it shows negative values, wage increases were too low. Z2, on the other hand, displays those shocks to price inflation at any given moment that are not accounted for by developments in wages. These might for example be due to increases in oil and commodity prices, exchange rate depreciations, changes in currency or the tax system and so on.

In order to be able to estimate equations (18) and (20), we had to first define expected inflation, expected labour productivity and the employment gap. We

[24] We assume a constant mark-up, hence the mark-up has no influence on price inflation.

once more employed the time series of expected inflation estimated with the VAR model in section 3.3.2 and assumed adaptive expectations regarding changes in labour productivity which we proxied with a three-year moving-average process. The unemployment gap finally was calculated as the deviation of the actual unemployment rate from its time-varying trend extracted with the Hodrick-Prescott-filter (see (Hodrick & Prescott, 1997)). Note that although including the unemployment gap into the wage equation implies the existence of a NAIRU, by refraining from using a deterministic trend we allow for a time-varying NAIRU.[25] After having identified all variables, we proceeded to estimate equation (18) in a state-space model, in order to obtain the wage-induced inflation shocks z1. Combining equations (18) and (20) then yields the wage-price system, allowing us to identify the external inflation shocks at any given moment during the estimation period:[26]

(22) $$\pi_t - \pi_t^e = c^w + c^\pi + f(u_t - \bar{u}) + z_{1t} + z_{2t} + \varepsilon_t, \text{ with } \varepsilon_t = \upsilon_t^w + \upsilon_t^\pi.$$

Since it was not possible to estimate the constants in equations (18) and (22) independent of the random walks z1 and z2, we extracted the constant component of the random walks, defining the constant as their respective means and the wage-price and exogenous price shocks as the remaining stochastic component.

Our state-space estimation of the wage equation (18) and the wage-price system (22) for Sweden gave the following results (standard errors are in parentheses)[27]:

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[25] In the literature there exist various approaches that directly estimate the time-varying NAIRU using for example a Kalman-filter in a similar wage equation framework (see for example Staiger, Stock & Watson, 1997 and Gordon, 1997).

[26] The model draws on Fritsche, 2006 and Blinder & Yellen, 2001. In contrast to their specification we assume no asymmetry of expectations regarding labour productivity between workers and employers, but rather presume that both groups form their expectations of future labour productivity according to a moving average of its past values.

[27] In order to obtain stable and plausible results, we had to restrict some of the variances to $\nu_t^w \sim N(0,0.1)$, $\nu_{1t} \sim N(0,0.7)$ and $\varepsilon_t \sim N(0,0.5)$. The variance of z2 was estimated to be $\nu_{2t} \sim N(0, e^{\frac{1.280}{(0.121)}})$.

(18a) $$\hat{W}_{nt} = 0.801 + \hat{\lambda}_t^e + \pi_t^e - \underset{(0.185)}{0.847}(u_t - \bar{u}) + z_{1t} + \upsilon_t^w$$

(22a) $$\pi_t - \pi_t^e = 0.801 + 0.041 - \underset{(0.185)}{0.847}(u_t - \bar{u}) + z_{1t} + z_{2t} + \varepsilon_t .$$

Figure 3-9: Time-varying wage-price shocks and exogenous prices shocks in Sweden

(cf. Appendix B, p. 179)

In accordance with the results from the simple wage indicator for Sweden, z1 also suggests that in 1975 wages experienced a considerable positive shock. A strong negative outlier in z2 in the same year implies that companies were not able to pass the increased nominal wage costs onto their prices but instead had to accept losses in profits. The positive peaks in z2 after the negative shock at the end of the 1970s clearly depict the exogenous price shocks due to the devaluations and the subsequent negative wage-price shocks shown in z1. The second half of the 1980s seems again to have been dominated by high wage increases along with profit cuts of firms. Around 1991, z1 once more indicates negative wage shocks in the advent of the crisis, although not as strong as implied by the wage indicator. Once more, the negative wage-price shock is accompanied by a strong positive external price shock, pointing to the high inflation after the banking and currency crisis. After the crisis, there seems to have been a period of rather high wage increases for the latter half of the 1990s. z1 and z2 suggest that since 2000, both, wage-price inflation and exogenous price inflation, have hardly been disturbed by shocks.

The state-space estimation of the wage-price system for *Finland* yielded the following coefficients[28]:

(18b) $$\hat{W}_{nt} = 1.819 + \hat{\lambda}_t^e + \pi_t^e - \underset{(0.069)}{0.203}(u_t - \bar{u}) + z_{1t} + \upsilon_t^w$$

(22b) $$\pi_t - \pi_t^e = 1.819 - 0.062 - \underset{(0.069)}{0.203}(u_t - \bar{u}) + z_{1t} + z_{2t} + \varepsilon_t .$$

Figure 3-10: Time-varying wage-price shocks and exogenous prices shocks in Finland

(cf. Appendix B, p. 180)

For Finland we observe a strong shock on wage-inflation in 1975-1976, which is immediately followed by an even stronger negative shock to wage increases in Finland. This result was also suggested by the simple wage indicator for Finland and can be interpreted as an effect of imported inflation and overshooting nominal wage increases, on the one hand, and of the subsequent negative shock to wages as unemployment increased during the ensuing crisis, on the other hand. The wage-price shocks are matched by opposite external price shocks, which imply that the strong wage increases around 1975 were not passed on to prices immediately, but that prices increased with a lag in response to the wage-price shock and to the external oil price shock. Compared to our findings for Sweden, the deflationary shock to wages after the high wage increases in the middle of the 1970s seems to have been stronger than the preceding overshooting of wages. In 1979, the state-variables depict another positive shock to wages and a simultaneous negative shock to prices, which can probably be explained by the second oil crisis, where, again, it seems that prices increased with a lag while nominal wages immediately experienced the shock due to imported inflation. In the second half of the 1980s, a longer period of wage-induced inflation is depicted by the state-variable z1. The crisis at the beginning of the 1990s is also depicted by the state-variable z1 which suggests deflationary influence of wage increases for the first half of the 1990s. On the contrary, external inflationary pressure after the banking and currency crisis is reflected by a positive peak of z2 between 1992 and 1995. After a positive peak of z1 indicating a

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[28] Again, we restricted some of the variances, since they were estimated to be insignificant or caused implausible results: $\nu_t^w \sim N(0,0.01)$ and $\nu_{1t} \sim N(0,0.4)$. The variances of the signal and the state equation of the wage-price system as in equation (22) were estimated to be $\varepsilon_t \sim N(0, e^{\underset{(0.923)}{-2.119}})$ and $\nu_{2t} \sim N(0, e^{\underset{(0.201)}{0.372}})$.

positive wage shock after the crisis in 1995, both wage-price and exogenous inflation shocks seem to have diminished.

Finally, our estimation of the wage-price system in a state-space model for *Denmark* yielded the following coefficients for equations (18) and (22)[29]:

(18c) $$\hat{W}_{nt} = 0.510 + \hat{\lambda}_t^{e} + \pi_t^{e} - \underset{(0.083)}{0.216}(u_t - \bar{u}) + z_{1t} + \upsilon_t^{w}$$

(22c) $$\pi_t - \pi_t^{e} = 0.510 - 0.053 - \underset{(0.083)}{0.216}(u_t - \bar{u}) + z_{1t} + z_{2t} + \varepsilon_t$$

Figure 3-11: Time-varying wage-price shocks and exogenous prices shocks in Denmark

(cf. Appendix B, p. 181)

Generally, the wage and price shocks depicted by z1 and z2 in the state-space model seem to be smaller and less significant than those found for Sweden and Finland. The outstanding overshooting of wages above the stability-oriented level around 1974, depicted by the wage indicator for Denmark in Figure 3-11, unfortunately cannot be confirmed by the wage-price shocks z1 since the model was only estimated from 1977q1 onwards due to data availability. The positive shock to wages caused by imported inflation after the second oil price shock, is now found to be insignificant. In contrast, the positive shock to wages in 1987 with generous wage-settlements after the prolonged period of wage moderation in the 1980s is reflected significantly by z1. Contrary to the deflationary shocks to wages during the 1980s, the state-variable z2 depicts two strong inflationary shocks, probably due to the lagged effect of the second oil shock and the devaluations at the beginning of the 1980s. Finally, after 1989, both z1 and z2 experience a downward shock suggesting a strong deflationary pressure on the whole Danish economy in 1991 due to the recession following the German reunification. After the deflationary shock, the Danish price level seems to have

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[29] Again, in order to guarantee the stability of the model, we had to restrict some of the variances to $\nu_t^{w} \sim N(0,0.8)$, $\nu_{1t} \sim N(0,0.01)$ and $\varepsilon_t \sim N(0,0.7)$, respectively. The variance of z2 was estimated to be $\nu_{2t} \sim N(0, e^{\underset{(0.283)}{-1.116}})$.

been remarkably stable, showing no external price shocks and insignificant or slightly positive wage shocks.

3.3.3 Preliminary summary of the results

In line with our results for monetary policy in Sweden, Finland and Denmark, the analysis of wage policy in the Scandinavian countries suggests that wage increases stabilised significantly around 1995 and have been stability-oriented ever since. While on the one hand this might be attributed to an increased deregulation of the wage bargaining systems, it is also probably due to the decrease in external price shocks. Departures from the stability-oriented level of nominal wage increases in the Scandinavian countries were generally found to be due either to overshooting wage increases in response to imported inflation, after the oil price shocks, for instance, or to overly strict wage moderation after the crises in the 1980s and at the beginning of the 1990s.

3.4 VAR Analysis of macroeconomic policy regime constellations

While we separately investigated the main areas of macroeconomic policy, i.e. fiscal, monetary and wage policy, for each of the Scandinavian countries in the previous sections of this chapter, we additionally estimated autoregressive systems (VARs) in order to trace the impact of interdependencies between the various areas of macroeconomic policy on the growth variable, and hence, the consistency of the macroeconomic regime constellations.

There are numerous approaches to VAR analysis of one area of macroeconomic policy, mostly on monetary policy.[30] However, to our knowledge none of them investigates the interdependencies between all the areas of macroeconomic policy on the economic performance of the country. We are convinced that this is an important aspect of the analysis of economic policy, especially with regard to the current discussion about the necessity of coordination be-

[30] See, amongst many others, Bagliano & Favero, 1998, Clarida, 2001 for VAR approaches to analyse monetary policy. For VAR-analyses of fiscal policy see for instance Blanchard & Perotti, 1999, Fatás & Mihov, 2001 and Scheremet, 2001.

tween the different areas of macroeconomic policy.[31] This is why we estimated a structural macroeconomic policy VAR for the three Scandinavian countries, including fiscal, monetary and wage indicators combined with a cyclical output variable. In order to control for the effect of external trade and changes in the exchange rate on the economy, we also included the cyclical component of the real effective exchange rate (REER).

3.4.1 Results for the VAR for macroeconomic policy

In our economic policy VAR, we incorporated the fiscal, monetary and wage indicators which we had derived in the previous chapters as measurements of the cyclical impact of the respective policies. Due to statistical problems that arise in the VAR estimation with endogenous time series that show very persistent moving-average processes arising for instance from the use of band-pass filters, we were not able to include the output gap as the cyclical GDP variable in the VAR, since it was calculated with a band-pass filter. Instead, we used the growth rate of real GDP as a proxy, as it can be argued that the growth of GDP also varies with the business cycle, but shows more variability with no frequencies excluded when compared to a band-pass filter derived output gap. For the three Scandinavian countries under investigation here, the output gap and the growth of real GDP generally showed a very similar course over the span of time covered in our investigation. In addition to the endogenous variables, we included an exogenous constant and various dummies to correct for outliers (Finland: 1977q4, 1987q1 and 1980q3. Denmark: 1993q1)

Since all the variables included in the VAR were found to be stationary at the 1% significance level, with the exception of GDP growth in Denmark, where the null hypothesis could only be rejected at the 10% level (see Table A7 in the Appendix), it was not necessary to test for cointegration. This is why all variables could be included in levels. In the case of Sweden and Finland, after analysing the residuals of the VARs over the whole estimation period from 1970q1 until 2006q4, we identified a structural break at the end of the 1980s in both coun-

[31] See for example Hein & Truger; 2004, Koll, 2004 and Watt, 2004.

tries and hence divided the estimation periods. Thus, we estimated two VARs for Sweden for the periods 1976q2 – 1990q4 and 1991q1 – 2006q2 and two VARs for Finland for the periods 1975q4 – 1986q4 and 1987q1 – 2005q1. The varying start and end periods are due to data availability for the indicators of macroeconomic policy and to the fact that quarterly data for the REER was only available from 1975q1 onwards. Since we obtained data for the fiscal indicator for Denmark only after 1980q1, we estimated only one VAR for Denmark, covering the periods 1982q1 – 2006q4.

After analysing lag length criteria and lag exclusion tests, the VARs were estimated with lag lengths between 3 and 6 quarters (see Tables A8, A11, A14, A17 and A20 in the Appendix). Generally, all VARs are suggested to be stable, since all the unit roots were found to lie well within the unit circle (see Figures A4 – A8 in the Appendix). Autocorrelation in the residuals as tested with a LM test does not seem to be a major problem in any of the VARs (see Tables A9, A12, A15, A18 and A21 in the Appendix). The normality of the residuals for the second VAR for Sweden and the first VAR for Finland, however, could not be confirmed, which was due to kurtosis problems. Our tests confirmed that the remaining VARs have normally distributed residuals (see Tables A10, A13, A16, A19 and A22 in the Appendix).

With the aim of identifying the structural interdependencies and hence the response of the endogenous variables in the VAR to structural shocks either in macroeconomic policy or in the output variable, we imposed structural restrictions on the relationship between the reduced form residuals of the model (u_t) and the underlying structural innovations (e_t). Suppose a relation between the VAR residuals u_t and the structural innovations e_t according to

$$u_t = \mathbf{B}^* e_t, \text{ with } E[ee'] = I \tag{23}$$

where **B** denotes the matrix defining the contemporaneous relations between u_t and e_t. In order to just identify the system, we have to impose $(n^2 - n)/2$ restrictions on **B** which in our case with five endogenous variables amounts to ten re-

strictions.[32] With regard to the quarterly structure of our data, we hypothesise that the residuals of the equation explaining the growth of GDP are influenced by simultaneous innovations in monetary and fiscal policy, but not by simultaneous shocks to wage policy. Residuals of the equation explaining monetary policy, though, are assumed to be influenced by structural innovations to fiscal policy only. One might argue that, assuming a zero influence of simultaneous shocks to wage policy on monetary policy and on GDP growth, does not seem convincing from a theoretical point of view. However, it has to be noted that this does not exclude the impact of lagged shocks to wage policy, and since we used quarterly data, it might well seem plausible that changes in wage policy, which usually apply to a relatively long time horizon, only would affect GDP growth and monetary policy with a lag of at least one quarter.

For the residuals of the equation for fiscal policy, we allowed simultaneous influences of shocks to the growth of output and of monetary policy, since the fiscal automatic stabilisers usually react instantaneously to shocks to the economy. While it seems plausible that shocks to the growth of GDP itself and shocks to monetary policy have an immediate impact on the economy and thus on the automatic stabilisers, we argue that shocks to wage policy can be assumed to affect the economy with a lag of at least one quarter.

Furthermore, we restrict the simultaneous influences of shocks to the growth of GDP and of monetary policy on the residuals of wage policy to zero, merely allowing a contemporaneous influence of shocks to fiscal policy. Finally, we hypothesise that shocks to the real effective exchange have no immediate impact on the residuals of the equations defining the fiscal indicator and the wage indicator, since these would react with a lag of at least one quarter. Conversely, we assume that the residuals of the equation explaining the REER are not influenced instantaneously by structural shocks to GDP growth and the fiscal indicator.

In sum, the **B** matrix takes the following form:

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[32] On the methodology of structural VARs (SVARs) and the identification of the restrictions see

$$(24) \qquad \begin{pmatrix} u_t^{\hat{y}} \\ u_t^{mon} \\ u_t^{fiscal} \\ u_t^{wage} \\ u_t^{reer} \end{pmatrix} = \begin{bmatrix} a_{11} & a_{12} & a_{13} & 0 & a_{15} \\ 0 & a_{22} & a_{23} & 0 & a_{25} \\ a_{31} & a_{32} & a_{33} & 0 & 0 \\ 0 & 0 & a_{43} & a_{44} & 0 \\ 0 & a_{52} & 0 & a_{54} & a_{55} \end{bmatrix} \begin{pmatrix} e_t^{\hat{y}} \\ e_t^{mon} \\ e_t^{fiscal} \\ e_t^{wage} \\ e_t^{reer} \end{pmatrix}.$$

After solving the system with the restrictions defined in equation (24), we analysed the structural VARs with respect to their impulse-response functions and their variance decompositions. While the impulse-response functions trace the response of the endogenous variables in the VAR to a one-standard-deviation structural shock in one of the endogenous variables for eight years[33], the variance decomposition depicts the percentage of the variance of one of the endogenous variables that is due to immanent shocks or the other endogenous variables over a period of 10 years.

4.5.1.1 Sweden

Figure A9 in the Appendix represents the impulse-response functions for the first VAR for macroeconomic policy in *Sweden*, covering the period 1976q2 – 1990q4. Obviously, there is no significant response of the growth of GDP to shocks in macroeconomic policy or the REER to be discerned. In general, the impulse-responses seem to be largely insignificant. Nevertheless, we observe a small but significant negative response of the monetary indicator to a shock in the fiscal indicator and, conversely, a positive response of the fiscal indicator to a shock in monetary policy for the first few quarters. This suggests that an expansive fiscal shock induced expansive monetary policy, while a restrictive monetary policy shock induced expansive fiscal policies in Sweden in the first estimation period. Finally, we find that the fiscal indicator reacts restrictively to a shock in the real effective exchange rate, albeit with a lag of some quarters and only to a small degree.

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for instance Hamilton, 1994, Scheremet, 2001 and Gottschalk, 2005.

[33] We show the impulse-response functions with significance bands of +/- 2 standard errors.

Figure 3-12: Variance decomposition of the VAR I for Macroeconomic Policy in Sweden 1976q2 – 1990q4

(cf. Appendix B, p. 182)

We find that the major part of the *variance of GDP growth* (around 60%) is explained by a shock to itself. As far as the macroeconomic policy variables are concerned, we find that the fiscal indicator accounts for most of the variance of GDP growth (around 20%), while both the monetary indicator and the cyclical REER explain about 10%.

In line with the results suggested by the impulse-response functions, we find that nearly 60% of the variance of the *monetary indicator* is explained by a shock to fiscal policy, while the other variables account for about 10% each.

Conversely, the variance of the *fiscal indicator* is explained to nearly 80% by a shock to monetary policy in the first quarter, confirming the seemingly strong interdependence between the two areas of macroeconomic policy when controlling for the REER. The explanatory power of the monetary indicator for the fiscal indicator, however, declines in the subsequent periods to approximately 30%, while the part of its variance explained by GDP growth rises to 30%. It thus seems that fiscal policy in Sweden during the first estimation period was influenced significantly by shocks to GDP growth. At the same time, however, we find a significant influence of monetary policy and of the REER which also accounts for about 30% of the variance of the fiscal indicator.

The variance of the *wage indicator* is suggested to be influenced primarily by a shock to itself, but also to almost 30% by a shock to GDP growth. Finally, we find that the *variance of the REER* is largely explained by shocks to itself, but can also be accounted for to between 10-20% by GDP growth, fiscal and monetary policy. It is interesting that the impact of a shock in fiscal policy on the REER was found to be strongest among the macroeconomic variables.

Figure A10 in the Appendix depicts the impulse-response functions for the second VAR for macroeconomic policy in Sweden, covering the period 1991q1 – 2006q2. By and large, impulse-responses of the macroeconomic policy variables and the growth of GDP are found to be small and often insignificant.

However, we find a negative response of GDP growth to shocks to monetary policy and the cyclical REER, even though it is a very small one and only significant in the third or fourth quarter after the shock. Even though they are insignificant, the impulse-responses due to shocks to fiscal and wage policy nevertheless show the expected symptoms. The significant impulse-response functions operating between monetary and fiscal indicators are only hardly significant in the second VAR for Sweden, but we do find a small but still significant negative response of the fiscal indicator to a shock to GDP growth, hinting at a countercyclical fiscal policy in Sweden even in the second estimation period. Furthermore, a shock to the wage indicator seems to have a significantly negative impact on the fiscal indicator after a few quarters and vice versa. Interestingly, a small negative response of the fiscal indicator to a shock to the REER is also suggested for the first quarters after the shock.

Figure 3-13: Variance decomposition of the VAR II for Macroeconomic Policy in Sweden 1991q1 – 2006q2

(cf. Appendix B, p. 183)

It is suggested by the results for the second VAR that the *variance of GDP growth* is explained almost equally by shocks to monetary, fiscal and wage policy as well as the cyclical REER (explaining around 20% each). We also observe that the variance of the *monetary indicator* is for the most part explained by shocks to the fiscal and the wage indicator, whereas shocks to the growth of GDP and the cyclical REER seem to have exerted a small influence on the monetary indicator in the second estimation period in Sweden only.

The variance of the *fiscal indicator*, on the other hand, seems to result from shocks to the growth of GDP (up to 60%) and to the REER (about 35%) in the first quarters. After about 10 quarters, however, the explanatory influence of shocks to the wage indicator increases to nearly 30%, whereas only 30% of the variance of the fiscal indicator are owed to a shock to GDP growth. Thus, it is suggested that after 10 quarters, fiscal policy is mainly influenced by GDP growth and wage policy in the second estimation period in Sweden.

Similar to our results for the first VAR for Sweden, the variance of the *wage indicator* seems to be mainly explained by a shock to itself, but monetary and fiscal policy shocks account for about 20% and 30%, respectively.

Finally, the *variance of the REER* is found to be almost completely due to shocks to itself in the second estimation period for Sweden, which is not surprising, in light of the fact that the Swedish krona was allowed to float in 1992. However, a shock to wage policy still accounts for about 20% of its variance, which is an interesting result reinforcing the effect that after the floating of the currency only shocks to labour costs had any influence on Sweden's international competitiveness since monetary policy no longer intervened.

4.5.1.2 Finland

Figure A11 in the Appendix shows the impulse-response functions for the first VAR for macroeconomic policy for Finland which was estimated for the period 1975q4 – 1986q4. Generally, impulse-response functions for the endogenous variables in the first VAR are found to be even less significant than those in the VARs for Sweden. We do not identify any significant responses of GDP growth to shocks in the macroeconomic policy indicators or the cyclical REER. The impulse-response functions for the monetary indicator hint at very small negative reactions to shocks in wage policy and the REER, however, these are hardly relevant, since they aresignificant for one quarter only. It also seems that the wage indicator and the cyclical REER responded positively to shocks in the other variable, , at least for the first few quarters.

Figure 3-14: Variance decomposition of the VAR I for Macroeconomic Policy in Finland 1975q4 – 1986q4

(cf. Appendix B, p. 184)

In line with our results for the VAR for Sweden, we find that the *variance of the growth of GDP* mostly originates from fiscal policy and monetary policy in the first estimation period. The fiscal indicator accounts for 30% of its variance, while the monetary indicator explains at least 20% of the variance of GDP growth. Another important finding is the evidence of significant interdependen-

cies between the single indicators of macroeconomic policy in the first VAR for Finland. With respect to the *monetary indicator*, a large part of its variance is explained by the wage indicator (around 30%); another significant part is accounted for by the REER (around 20%). Furthermore, the results from the VAR imply that large parts of the variance of the *fiscal indicator* can be attributed to shocks either to GDP growth (around 40%) or to the monetary indicator (around 30%), while the wage indicator accounts for 20%. Finally we find that the variance of the *wage indicator* is explained by shocks to GDP growth and to the monetary indicator.

All things considered, we could identify strong interactions between the realms of macroeconomic policy in the first VAR for Finland. The REER merely explains a significant part only of the variance of the monetary indicator. This might be due to the fixed exchange rate regime in use in Finland during the 1980s, which in turn led to a controlled exchange rate through monetary policy. With respect to the variance decomposition of the REER, we observe that almost equal parts of its variance are accounted for by shocks to GDP growth, the monetary indicator and the wage indicator, suggesting that Finland's international competitiveness in the first estimation period was influenced by the business cycle and labour costs, on the one hand, and by active monetary policy, on the other hand.

Figure A12 in the Appendix depicts the impulse-responses for the second VAR, covering the period 1987q1 – 2005q1 in Finland. Similar to the results for the first VAR, the results in this figure are largely insignificant. Again, we do not find any significant response of GDP growth to any of the shocks to the macroeconomic policy indicators or the cyclical REER. The fiscal indicator responds slightly negatively to a shock in GDP growth, but the effect is barely discernible after a few quarters. It is remarkable that we also find a small significantly positive impact of a shock to the REER on the fiscal indicator.

Figure 3-15: Variance decomposition of the VAR II for Macroeconomic Policy in Finland 1987q1 – 2005q1

(cf. Appendix B, p. 185)

In contrast to the results of the first VAR, where we found at least a significant influence on the variance of the monetary indicator, the REER in the second VAR for Finland has very little explanatory power concerning the variances of the other endogenous variables. . Here, it seems that shocks to the REER explain less than 10% of the variance of GDP growth and the macroeconomic policy indicators after 1987. We think that this is due to the floating of the Finnish exchange rate in 1992, on the one hand, and to its accession to the EMS in 1996, on the other hand.

In the second VAR, the major part of the variance of *GDP growth* is now found to be explained by a shock to the monetary indicator (40%). In contrast to our findings in the second VAR for Finland, however, shocks to the fiscal indicator here account for at least (30%) of the variance of GDP growth.

Furthermore, the variance of the *monetary indicator* is explained by shocks to the fiscal indicator to as much as 50%, which suggests an increased interaction between fiscal and monetary policy rather than less interdependency. With respect to the variance of the *fiscal* indicator, we find that it is explained to up to 75% by a shock to GDP growth in the first quarter and after five years. Both shocks to GDP growth and to the monetary indicator account for about 25% each, whereas shocks to the wage indicator explain about 20%. This suggests a rather strong mutual dependence between the single realms of macroeconomic policy in Finland in the second estimation period, as well.

The variance of the *wage indicator* is to large parts attributed to shocks to itself, but shocks to the monetary indicator explain about 20% after 15 quarters. Finally, although it had no significant impact on the variance of the other endogenous variables, the variance of the *REER* is nevertheless influenced by shocks to monetary policy (20%), and even stronger, by shocks to fiscal policy (30%). This result suggests that changes in Finnish competitiveness after 1987 were due to active fiscal and monetary policies rather than to labour costs or the business cycle. This might be explained by the structural change to an export-oriented economy enforced by fiscal and monetary policy after the crisis in the early 1990s in Finland.

4.5.1.3 Denmark

Figure A13 in the Appendix finally represents the impulse-response functions for the VAR for macroeconomic policy in the remaining country of our Scandinavian sample, Denmark. As we have stated above, due to the data availability, we only estimated one VAR for Denmark, covering the period 1982q1 – 2006q4. In line with our results for the impulse-response functions of the VARs in Sweden and Finland, impulse responses are also found insignificant in Denmark with no significant response of GDP growth to shocks in the macroeconomic policy indicators or the cyclical REER. The impulse-responses of the monetary indicator in the VAR for Denmark suggest a small negative response to a shock to the fiscal indicator (significant after a few quarters) and to the wage indicator (significant in the first few quarters). Both responses, however, are very small and only just significant. Similarly, we find a very small significant response of the fiscal indicator to a shock in the wage indicator. Interestingly, the most significant response to an impulse is found for the cyclical REER, which seems to react positively to a shock in the wage indicator.

Figure 3-16: Variance decomposition of the VAR I for Macroeconomic Policy in Denmark 1982q1 – 2006q4

(cf. Appendix B, p. 186)

The output variable and international competitiveness in Denmark are presented in Figure 3-16. Similar to our results for the first VAR for Finland, we find that *shocks to the cyclical REER* only influence the variance of the monetary indicator, explaining about 10% of its variance. Of all the three Scandinavian countries studied here, Denmark seems to be the country with the slightest impact of the REER on the output variable and the realms of macroeconomic policy. Since Denmark neither experienced a currency crisis during the time span covered here, nor structural breaks with changes from a fixed exchange rate regime to a floating currency regime, this result seems quite plausible. Hence, it is not surprising that the variance of the cyclical REER in Denmark is found to be largely influenced by shocks to itself (about 65%) and that shocks to the wage indicator account for about 25% of its variance, suggesting that Den-

mark's international competitiveness throughout the span of time we cover in this study was not influenced by fiscal or monetary policy but only by means of changes concerning labour costs. The implication of the interdependency between the REER and the wage indicator found in the impulse-response functions is thus reinforced by the variance decomposition.

The variance of the *growth of GDP* is found to be largely explained by shocks to itself (as much as 70%), however we also find that monetary, fiscal and wage policy to equal parts explain the remaining variance of GDP growth. Furthermore, it is suggested that the variance of the *monetary indicator* is explained to almost 30% by the fiscal indicator, indicating a rather strong interdependence between fiscal and monetary policy in Denmark. Both the monetary indicator and the wage indicator seem to hardly react to shocks to GDP growth. As to the monetary indicator, along with the impact of shocks to the fiscal indicator, shocks in the REER also account for about 10% of its variance, while in the case of the *wage indicator* we find a very strong impact of shocks to itself on the variance of the wage indicator. Hence, it seems that the Danish wage policy is quite independent from the other realms of macroeconomic policy.

With regard to the *fiscal indicator*, we again find that its variance decomposition is influenced to significant parts by the output variable (30%), by the monetary indicator (about 25%) and by the wage indicator (about 15%). This suggests that fiscal policy in Denmark was quite sensitive to the other realms of macroeconomic policy.

3.4.2 Comparison of the results

Our results from the analysis of the variance decompositions of the variables contained in the VARs for macroeconomic policy in the Scandinavian countries presented in the preceding section are summarised in Table 4-1.

Table 3-1: Summary of the results of the VARs for Macroeconomic Policy in Scandinavia

(cf. Appendix B, p. 187)

Table 3-1 depicts the main effects of a shock to one of the endogenous variables of the VAR on the other variables. We define a major impact of a shock as explaining at least 20% of the variance of the influenced variable.

Comparing the impact of a shock to the output variable, that is to GDP growth, on the macroeconomic policy indicators in the first VARs for Sweden and Finland, we find that the shock has had a large effect on output growth itself and, to a lesser extent, also on the different realms of macroeconomic policy. However, an effect on monetary policy could not be measured above 20% of its variance. For the second estimation period, it seems that both, wage policy and monetary policy, acted independently of shocks to output growth, and only the output variable itself and fiscal policy experienced the consequences of the shock. The same applies to the VAR for Denmark.

With respect to the effects of shocks to fiscal and monetary policy, the VAR results won from the variance decompositions imply that in Sweden the interaction of the areas of monetary policy was mostly due to shocks to fiscal policy, while in Finland there was more interaction of macroeconomic policies after a shock to monetary policy. Nevertheless, both countries show strong interdependencies of all the realms of macroeconomic policy throughout both estimation periods. In the case of Denmark, there seems to have been a strong interaction of fiscal and monetary policy, but wage policy and the exchange rate seem to have been rather independent.

Interestingly, the results from the VARs for Sweden suggest a stronger interaction of macroeconomic policy after a shock to wage policy in the second estimation period, in contrast to Finland, where the opposite seems to have been the case. In Denmark, shocks to wage policy obviously did not have any impact on the output variable, fiscal or monetary policy; but a strong effect on the wage indicator itself is measured and a smaller effect on the real exchange rate is suggested.

Finally, shocks to the cyclical REER seem to have had effects above 20% of their variance on the other variables of the VARs only in Sweden and Finland in the first estimation periods, namely on fiscal policy and monetary policy, respec-

tively. After the floating of the exchange rates and due to the stable exchange rate system in Denmark, shocks to the international competitiveness seem to have been cushioned by the exchange rate.

4 CROSS-COUNTRY ANALYSIS OF THE EFFECT OF THE WELFARE STATE ON THE TREND OF GDP GROWTH

5.1 Introduction and data

Having analysed the macroeconomic regimes in the Scandinavian countries Sweden, Denmark and Finland and the interdependencies between the areas of macroeconomic policy and the output growth in the short and medium run, we are going to investigate the impact of the welfare state on the trend of GDP growth. We hypothesise that the relative economic success of the Scandinavian countries in the last 30 years was to a major part due to the stabilising and confidence building effects of the welfare state serving as a constant frame for macroeconomic policy. Hence, we analyse the impact of welfare state proxies on the long-run growth of GDP so as to take into account the long-run implications of our hypothesis.

Since due to the relatively small variability of standard welfare state proxies such as the wage share, for instance, it is difficult to obtain significant results for the impact of those variables in standard OLS time series regressions.[34] This is why we employed a cross-country approach and estimated simple cross-country regressions with five-year-averages of the variables for a sample of up to 25 industrialised countries. Generally, we controlled for the effect of standard growth determinants such as population growth, initial GDP (the five-year-average of the preceding five years in power purchasing parities (PPP)), investment (in % of GDP), consumption (in % of GDP) as well as exports and imports (in % of GDP). Using the general-to-specific approach we eliminated the growth variables that were not found to be significant. In addition to the classical growth determinants, we included a proxy for the welfare state in each specification. We concentrated on the effects of the welfare state on distribution and on education, since we assume that a relatively equal distribution and a high

[34] For an extensive summary of different econometric methods for analysing economic growth see Durlauf, Johnson & Temple, 2005.

level of education are two major effects of a functioning welfare state. Furthermore, we also chose distribution and education as the welfare state effects to be analysed here, as the Scandinavian countries are well known for their relatively egalitarian distribution and their high-quality educational system, which makes these areas good proxies of the Scandinavian welfare state model. Thus, our model takes the following form:

$$\hat{y}_t^{trend} = c + \alpha * X_t + \beta * Z_t + \varepsilon_t, \quad (25)$$

where $\hat{y}_t^{trend}$ stands for the five-year-average of the trend growth of GDP, X_t encompasses the five-year-averages of the standard growth variables mentioned above and Z_t represents the five-year-average of the welfare state proxy.[35]

We generally used annual data from the AMECO database of the European Commission (2007), covering the years 1970 – 2005. The trend of GDP growth was derived with a Hodrick/Prescott filter ((Hodrick & Prescott, 1997)) on the nominal GDP growth in PPP, thus allowing for a time-varying trend in GDP growth. In order to avoid distortions due to different currencies and exchange rates, variables were generally expressed in percent of GDP or as growth rates. Our proxies for distribution, on the one hand, were the wage share, adjusted for the compensation of the self-employed, from the AMECO Database and the Gini coefficient which we obtained from the Worldbank (2007) and from Eurostat (2007). The level of education, on the other hand, was proxied by the percentage of the population age 15+ that has attained secondary school and by the average schooling years of the population age 15+. Both measures were obtained from the Barro/Lee (2000, updated files) database on international education attainment where data is published in five-year-intervals. For the education proxies, we thus could not calculate five-year-averages but instead employed the value for the last year of the five-year-period.

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[35] Equation (25) is essentially equal to the regression known as Barro regressions due to Barro's extensive use of a similar specification to study alternative determinants for growth, see for instance Barro, 1991, Barro, 1996 and Barro, 1997. For a summary see Barro & Sala-i-Martin, 2004.

The sample of countries for our cross-country analysis generally consists of industrialised or emerging countries that can be assumed to have some sort of welfare state system. Due to data availability for the different welfare state proxies, the sample varies slightly with each regression. The whole sample contains a total of 28 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea (South), Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

5.2 Trend growth and distribution

As mentioned above, the effect of income distribution on the trend of GDP growth was first proxied by the effect of the adjusted wage share from the AMECO database (European Commission, 2007). Data could be obtained for the full estimation period since 1970, allowing us to estimate seven regressions covering the five-year intervals from 1971 – 2005. The cross-country regressions with the wage share were estimated for a sample of 22 countries, including Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea (South), Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States.

Table 4-1. The wage share as a proxy for the effect of income distribution on the growth trend

(cf. Appendix B, p. 189)

The estimated coefficients for the effect of the wage share on the trend of GDP growth over the five-year intervals from 1971 to 2005 are depicted in Table 4-1. Generally, we tried different specifications with regard to the control variables for each estimation period in order to test for the robustness of our results. The Durbin-Watson statistics suggest that the regressions were generally free from first order autocorrelation. The R^2 in some cases is quite low, but by and large shows satisfying values considering the low number of data points and the sim-

ple specification. For the first estimation period from 1971 – 1975, we find that the wage share has a highly significant positive effect on the trend of GDP with a very robust coefficient across different specifications. The estimation period covering the latter half of the 1970s also yields positive coefficients of the wage share, even though they are not significant. In the two estimations covering the 1980s, we again found positive coefficients of the wage share with regard to the trend of GDP growth. These coefficients, however, were only significant in one of the specifications each. It thus seems, that while the positive sign remains robust across different specifications, the size of the coefficient is not found as robust in the 1980s as in the first half of the 1970s. The estimation for the first half of the 1990s yields inconclusive results with respect to the effect of distribution on the trend of GDP growth: While we find two positive coefficients, with one being significant at the 10% level, we also estimate a negative coefficient of the wage share in one of the specifications. Finally, in the remaining two estimation periods, covering the latter half of the 1990s and the first half of the 2000s, the wage share seems to have exerted a significantly negative influence over the trend of GDP growth. It is thus suggested by our cross-country estimation of the effect of the wage share on trend growth, that at some point in the early 1990s a structural break occurred, and industrialised countries turned from wage-led growth to profit-led growth. However, since we do not analyse the direction of causality between the variables under investigation here, our results remain preliminary and should be interpreted with care.

The relation between trend growth and distribution was further investigated with the Gini coefficient as an additional proxy for distribution. Due to data availability, we were only able to conduct cross-country estimations with the Gini coefficient from 1996 to 2005, hence only covering the last two five-year-intervals. As mentioned above, we obtained data for the Gini coefficient from the Worldbank (2007), on the one hand, and from Eurostat (2007), on the other hand. Because data for the Gini coefficient are only rarely published on a regularly basis, we were only able to include 20 countries in our sample. The Gini coefficient regressions hence contain data for Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Mexico, the Nether-

lands, Poland, Portugal, Spain, Sweden, Turkey, the United Kingdom and the United States. Results from the regressions are presented in Table 4-2.

Table 4-2: The Gini coefficient as a proxy for the effect of income distribution on the growth trend

(cf. Appendix B, p. 190)

The Durbin-Watson statistics confirm freedom of first order autocorrelation for all the regressions, and the R^2 generally shows reasonable values. We find significantly positive coefficients of the Gini coefficient with regard to the trend in GDP for the two estimation periods, where coefficients seem to be larger in the first period from 1996 – 2000. However, the coefficients are generally not robust with respect to size in different specifications. Since a higher Gini coefficient (ranging from 0 to 1) implies a less egalitarian distribution, we have to interpret the positive coefficients vice versa: A positive coefficient suggests that a more egalitarian distribution exerts a negative influence over the trend of GDP growth. The results of the regressions taking the Gini coefficient as the proxy for distribution hence confirm our findings for the last two estimation periods with the wage share.

5.3 Trend growth and education

The second part of our analysis on the effect of the welfare state on trend growth covers the area of education. Ever since the PISA studies on the quality and level of education in the European countries, the high-quality educational system in the Scandinavian countries has been taken as a role model for industrialised countries. It is widely acknowledged that a high level of education is one of the requirements for a sustained growth path, since the effects of globalisation require industrialised countries to develop highly innovative and specialised industries in order to be able to compete with lower labour costs in less developed countries.

We thus chose to take education as the second proxy for the impact of the welfare state on the trend of GDP growth. As mentioned earlier, we took the percentage of the population age 15+ which has attained secondary school as the

first proxy for the level of education and the average schooling years of the population age 15+ as the second proxy. Both measures were obtained from the Barro/Lee (2000) database on international education attainment. Since data from the Barro/Lee database covers a wide variety of countries on a regularly basis, we were able to include a total of 25 countries in the cross-country regressions on education. The sample thus consists of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea (South), Mexico, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The cross-country regressions on education and the trend of GDP growth cover the period from 1971 to 2000.

Table 4-3: The percentage of the population age 15+ that has attained secondary school as a proxy for the effect of human capital on the growth trend

(cf. Appendix B, p. 191)

The results for the cross-country estimations of the effect of the percentage of the population that has attained secondary school on the trend of GDP growth are presented in Table 4-3. Generally, the equations seem to be well specified, with no first order autocorrelation indicated by the Durbin-Watson statistics. Values of the R^2 in some cases are quite low. Significance of the coefficient for secondary school attainment was reached at the 10% level only in a few specifications, indicating that the measured effect of secondary schooling on the trend of growth at least in this model was rather small and not always distinguishable from zero. For the first estimation period, covering the first half of the 1970s, we find that the percentage of secondary school attainment has a small negative influence on the trend of growth, which is found to be significant in one of the specifications. The same result applies to the second half of the 1970s as well, where we find a significant negative coefficient of secondary school attainment and a very small positive and insignificant coefficient. As we had expected, it seems that in the 1970s, higher schooling had no favourable influence on the trend of GDP growth. This might be due to the fact that the countries in

our sample generally experienced a structural break in the mid-1970s, where the trend of growth turned negative after reaching a maximum around 1975. The percentage of secondary school attainment, on the other hand, seems to have risen rather steadily in most of the countries during this period.

In the 1980s, we find positive, but small and insignificant coefficients for the effect of secondary school attainment on GDP growth. Especially in the latter half of the 1980s, the coefficient is found very close to zero and we were only able to estimate one specification. The same result applies to the estimation for the first half of the 1990s, where, again, we find an insignificant and very small positive coefficient. Finally, the cross-country estimations for the impact of secondary school attainment on GDP growth in the latter half of the 1990s yield somewhat larger positive coefficients, which only narrowly miss significance at the 10% level, at least in the second specification. Although the results from the simple cross-country estimations are once more quite preliminary and should be interpreted very carefully, it is nevertheless suggested that education measured by the percentage of secondary school attainment in the population has played an increasingly important role for the trend of GDP growth after the mid-1990s.

Table 4-4: The average schooling years of the population age 15+ as a proxy for the effect of human capital on the growth trend

(cf. Appendix B, p. 192)

Table 4-4 shows the results for the cross-country estimations with the average years of schooling in the population over 15 as the education proxy. Again, the Durbin-Watson statistics confirm freedom of first-order autocorrelation, and values of R^2 are reasonably high when considering the small number of data points. As in the estimations with the secondary school proxy, we find a negative effect of the average schooling years on the trend of GDP growth in the 1970s. For both estimation periods, we obtain one significant coefficient at the 5% or even 1% significance level. Our result of a negative relation between education and the trend of GDP growth in the 1970s is thus reinforced by the second proxy for the level of education. The cross-country estimations for the first half of the 1980s yield very small and insignificant but positive coefficients;

similar to the results of the estimations with the secondary schooling proxy. Thus, again, we find a break in the relation between the trend of GDP growth and the level of education in the earl 1980s. Surprisingly, we obtain a significant negative coefficient of the average schooling years in the estimation period of the latter half of the 1980s. However, we had to include a relatively high number of control variables to gain a statistically stable specification and were not able to estimate any alternative specification over this estimation period. Hence, the robustness of the negative coefficient can be mistrusted and the result could be misleading. Finally, the cross-country estimations for the 1990s again produced positive coefficients of the effect of the average years of schooling on the trend of GDP growth, albeit not significant ones. Again supporting our results with the secondary school attainment as the education proxy, we find that coefficients of the average schooling years are larger in the second half of the 1990s. However, significance even at the 10% level is still missing.

To sum up, both proxies for education suggest in our simple cross-country estimations that the level of education did not influence the trend of GDP growth positively in the 1970s but seems to have had a slight positive influence ever since. However, since significance is largely missed by the positive coefficients, the possibility of zero influence of education on the trend of GDP growth cannot be dismissed. Nevertheless, it is suggested by both proxies that the positive effect of education on the trend of growth has increased in the second half of the 1990s. Since this estimation period coincides with the period where we found that a more egalitarian distribution seems to have exerted a negative influence on the trend of GDP growth, it might be the case that at this point distribution lost some of its importance for the trend of growth, while other aspects of the welfare state like a high level of education consequently gained positive influence over the trend of GDP growth. Notwithstanding the simplicity of our estimation method and the resulting difficulties in measuring significant effects of the welfare state variables, there are still some indications that the different aspects of the welfare state mattered for the trend of growth during the estimation period covered here. Hence the relatively egalitarian distribution and the high level of education in the Scandinavian countries, to pick but two of the effects of

their welfare states, could explain at least to some degree their relative growth success. Still, our results remain preliminary and further research in this area is definitely required.

5 CONCLUSION

The aim of this study was provide answers to two large-scale research questions. While the first one is concerned with the causes of the remarkable macroeconomic resilience of the Nordic EU-countries since the mid-1990s, the second one is related to the sustainability of a high degree of government activity in times of financial globalisation. We started our inquiry with the suggestion that it is the Scandinavian welfare state that closely connects these short-term and long-term issues. It turned out that the concepts of norm-based regimes and regime constellations based on institutional complementarities are extremely helpful in the exploration of these interconnections. Based on a synthesis of different strands of research on welfare regimes, varieties of capitalism, and a norm-based macroeconomics, we developed our own *model of regime constellations* consisting of a "demand function" for normative-institutional complementarities (NIC) and a "supply function" of macroeconomic regime constellations (MERC). Considering the interaction of these two functions, we hypothesised that the Scandinavian EU countries started with the "high road" equilibrium of high coordination between NIC and MERC combined with good growth performances in the Bretton Woods era after WWII until 1973. A major shock to the macroeconomic coordination due to the end of the global fixed exchange rate system trapped Nordic EU-countries for some time in the "zone of transitional turbulence", resulting in a NIC-MERC-equilibrium with less coordination and deteriorating growth performances. Against this background the recovery after the most severe macroeconomic crisis in the whole OECD era in the early 1990s probably is to be interpreted as the reconstruction of a high degree of macroeconomic coordination by new means, in accord with the sophisticated coordination needs of a universalistic welfare state as the Scandinavian.

In order to validate our hypotheses, we first studied the literature exploring the main features of the Scandinavian welfare regime and its interaction with the macroeconomic set-up starting from the early post-war period. As a first result we found out that the Scandinavian welfare was established in the highly coordinated macroeconomic environment of the post-war period, designed to com-

bine full employment and price stability with a high level of income and gender equality. In a second step, we introduced the Swedish Rehn-Meidner model (RMM) as an early example for the exceptional Scandinavian choice of combining normative-institutional complementarities underlying the welfare regime with interactions with the macroeconomic regime constellation. Focused on guaranteeing full employment and price stability this approach was supposed to facilitate rapid structural change, a typical feature of a small, open economy with highly integrated goods markets. To this end it embraced two unique institutional complementarities. First, the labour market regime was reshaped by combining a centralised regime of wage bargaining with an active governmental labour market policy (ALMP). This is how a significant wage drift was avoided, which would have endangered the trade unions' approach of an egalitarian, "solidaristic" wage policy, and the overall macroeconomic goal of price stability at the same time. Second, a combination of high corporate taxation with a selective fiscal policy was implemented, in order to facilitate rapid structural change by providing the infrastructure that was required by the corporate sector as well as for the stabilisation of the social security system for the labour force. As one of the key elements of this model, ALMP "outlived" the special "Bretton Woods" constellation, which gave birth to RMM. Especially in Sweden and Denmark, ALMP remained a persistent feature of the Scandinavian macroeconomic regime constellation even after the breakdown of the worldwide fixed exchange rate system in 1973. In the course of our study we found out that the tremendous readiness in the Scandinavian societies to finance the welfare states by means of relatively high taxes and considerable social contributions is based on a high degree of public confidence in the system and its underlying egalitarian principles. Moreover, there is strong support for the formation and the execution of macroeconomic policies even in times of most severe macroeconomic crises, which results in a strong macroeconomic resilience.

The second part of our consultation of the relevant literature revealed that the attempts of returning to a high-road growth performance by means of tiding over the demands shocks with the help of significant wage increases on the one hand and a subsequent devaluation policy on the other hand, failed. In the

1980s, inflation in Sweden and Finland was fuelled by foreign capital flooding these countries. This development was caused by a hasty liberalisation of capital accounts without careful adjustment of the tax system and bank supervision, hence missing institutional complementarities. In contrast to that, the first Scandinavian country to opt against a similar deliberate devaluation policy was Denmark, with an explicit commitment to a fixed exchange rate policy in the framework of the ERM from 1982 on. Furthermore, Denmark was the first Scandinavian country to significantly enhance its banking supervision in order to manage the liberalised capital account and to adopt a dual-income tax. Obviously this is why Denmark was much better equipped for the turbulences caused by financial globalisation and the ERM crisis in 1992/93 originating in the German unification.

In order to calculate indicators for fiscal, monetary and wage policy separately and to identify structural breaks and regime shifts, we used correlation analysis and state-space models.

For the span of time we could cover due to data availability (1970 to 2006) we found out that *fiscal policies* generally follow a countercyclical pattern. The principal task of fiscal policy of stabilising the business cycle was generally accomplished. However, we also identified various periods of pro-cyclical fiscal policy in each country: Sweden seems to have employed pro-cyclical fiscal policies in response to restrictive shocks such as the devaluations in the 1980s and during the introduction of the nominal expenditure ceiling for its government in the second half of the 1990s. In contrast, the pronounced period of pro-cyclical fiscal policy we identified in Finland from the 1970s until the first half of the 1980s, seems to have emanated from an expansive fiscal policy in a period of booming economic activity. The deep economic crisis at the beginning of the 1990s, though, was followed by a rather restrictive fiscal policy in the second half of the 1990s in Finland as well, which was probably due to its commitment to the Maastricht criteria. In contrast to that, Denmark only shows a short period of pro-cyclical fiscal policy at the beginning of the 1990s.

The analysis of *monetary policy* in Sweden, Finland and Denmark revealed interesting insights with respect to its achievement of price stability, monetary disturbances, and the role of expected inflation. We generally observed a distinct stabilisation of monetary policy in Sweden and Finland after 1995, which in Denmark, again in contrast to that, seems to have been achieved around 1985 already. It seems that in Sweden and Finland, the introduction of an inflation target played a major role in the reduction of monetary shocks and the consequent stabilisation of inflation expectations after the end of fixed exchange rate regimes. In Sweden it was the national central bank that implemented this action, in Finland it was the ECB. In Denmark the combination of a commitment to a fixed exchange rate policy and a transparent monetary system that was sufficiently flexible to react to domestic challenges to price stability and growth ensured a stable monetary environment and avoided the banking and currency crisis at the beginning of the 1990s.

Before 1995 departures from the stability-oriented level of nominal wage increases in the Scandinavian countries were generally found to be either caused by overshooting wage increases in response to imported inflation, after the oil price shocks of the 1970s, for instance, or by an overly strict wage moderation after the crises in the 1980s and at the beginning of the 1990s. In line with our results for monetary policy in Sweden and Finland, the analysis of *wage policy* in the Scandinavian countries suggests that wage increases stabilised significantly around 1995 and have been stability-oriented ever since. This is also probably due to the decrease in external price shocks after the huge devaluations of the early 1990s as well as to the stabilisation of the inflation expectations after the shift of monetary policy regimes to inflation targeting.

In order to validate our hypothesis on the significance of macroeconomic regime constellations, we attempted to identify interdependencies between the different areas of macroeconomic policy and output in a SVAR-model, including the effect of economic integration via the exchange rate. Due to restrictions of the data availability, and to the structural break we identified for Sweden and Finland at the end of the 1980s, we estimated two VARs for Sweden for the periods 1974 to 1990 and 1991 to 2006 and two VARs for Finland for the periods

1973-1986 and 1987-2005. Since we only had obtained data for the fiscal indicator in Denmark after 1980, we confined ourselves to estimating one VAR, covering the period from 1982 to 1986.

A diachronic comparison of the estimation periods in Sweden provides us with good reason to assume a shift in the orientation of the country's economic policy from a priority of growth and full employment to a priority of price stability, and hence, of the macroeconomic regime constellation. It is well documented that this development took place in Sweden at the beginning of the 1990s. When including the real effective exchange rate, strong interdependencies between the areas of macroeconomic policy in Sweden become apparent and it is difficult to identify a hierarchy between them. Each variable of the macroeconomic policy apparently accounts to almost equal parts for the variance of GDP growth.

In line with our results for Sweden it is also suggested by our findings for Finland that the growth of output had a decreasing influence on the macroeconomic policy indicators in the second estimation period. Consequently, the variance of output growth was to an increased degree caused by shocks to itself. With regard to the areas of macroeconomic policy, it seems that monetary policy had a much stronger impact on the growth of output and on the other macroeconomic policy areas in the second estimation period. This might be explained by the structural change of the Finnish economy from a priority of full employment ensured by the public sector to an export-oriented economy within the regulative framework of the EMS. While we still find that shocks to the growth of output explain less of the variance of the macroeconomic policy variables in the second augmented VAR than in the first one, it still seems that there were significant interdependencies between the areas of macroeconomic policy in both estimation periods. Nevertheless, the structural break due to the increased openness of the Finnish economy after the deregulation of the capital markets and the crisis in the beginning of the 1990s, is still obvious in the decreased effects of shocks to the REER on other endogenous variables, and in the decreased impact of shocks to the business cycle or to labour costs on the REER.

The macroeconomic policy VAR for Denmark suggests that, of all policy areas, it was the fiscal policy that had the strongest impact on GDP growth, even in the period after 1990, while all areas of macroeconomic policy reacted to shocks to GDP growth. Furthermore, we observe a strong interaction between the areas of macroeconomic policy, suggesting that the degree of coordination in macroeconomic policy in general was rather high in Denmark throughout the whole estimation period. It is suggested that the real effective exchange rate had no significant impact on the growth of GDP or on the macroeconomic policy areas during the span of time of the investigation, but was itself only influenced by wage policy. Equally, it seems that wage policy in Denmark was largely independent from the other areas of macroeconomic policy. But we have to keep in mind that especially fiscal policy and, to a slightly lesser degree also monetary policy, must have been subject to interdependences with the growth of GDP and the other areas of macroeconomic policy.

The results of our estimations of the impact of different welfare state proxies on the long-run growth trend in the Nordic countries were much more ambiguous than our analysis of the macroeconomic regimes. But despite the simplicity of our estimation method and the resulting difficulties in measuring significant effects of the welfare state variables, evidence suggests that the different aspects of the welfare state have played a decisive role in the trend of growth during the estimation period covered here. Hence the relatively egalitarian income distribution (with decreasing significance) and the high level of education in the Scandinavian countries (with increasing significance), to pick out but two of the effects of their welfare states, could explain at least to some degree their relative growth success. For the long-run growth trends, this might indicate a shift of the relative importance of income equality to an equality of opportunity, as it were. These results, however, are still preliminary, and further research in this area is definitely required.

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7 APPENDIX

Appendix A

Figure A 1: Inflation and expected inflation in Sweden

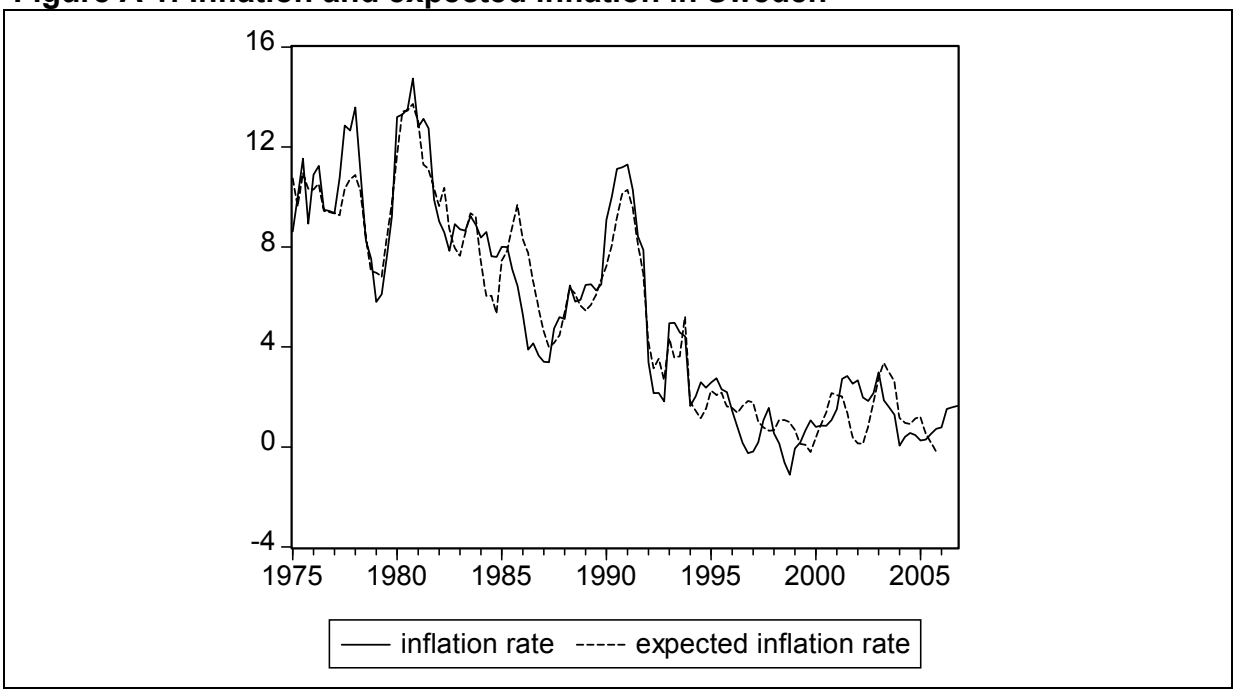


Figure A 2: Inflation and expected inflation in Finland

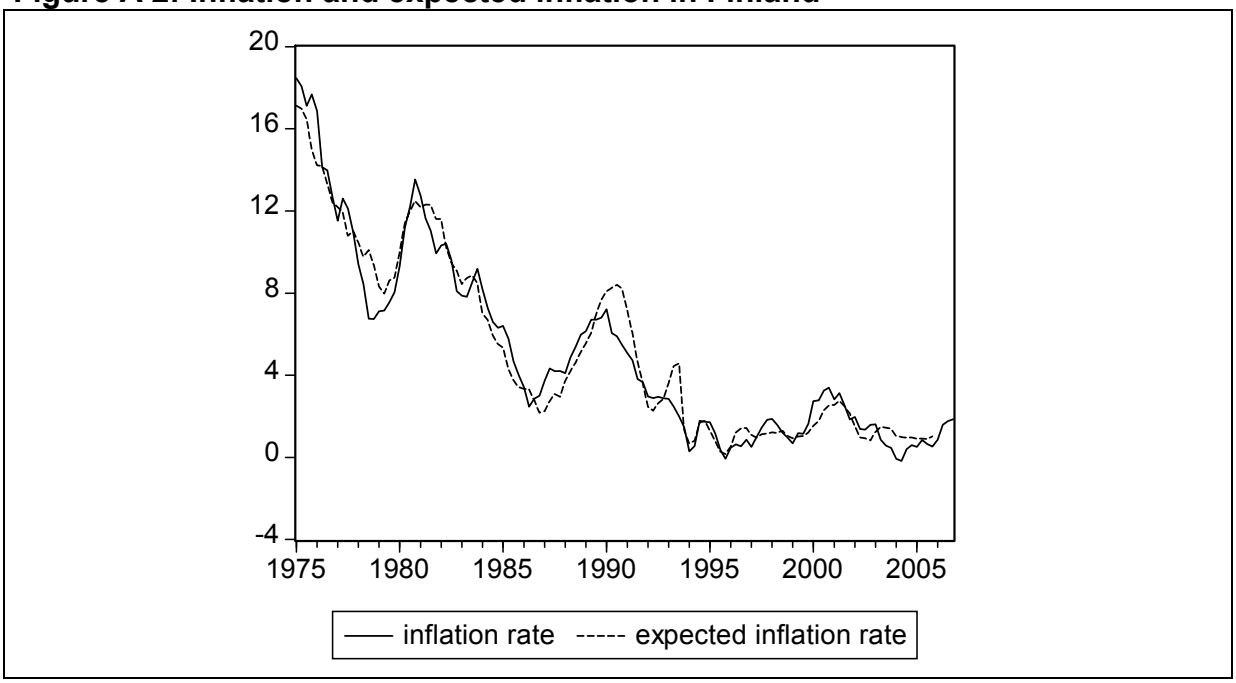


Figure A 3: Inflation and expected inflation in Denmark

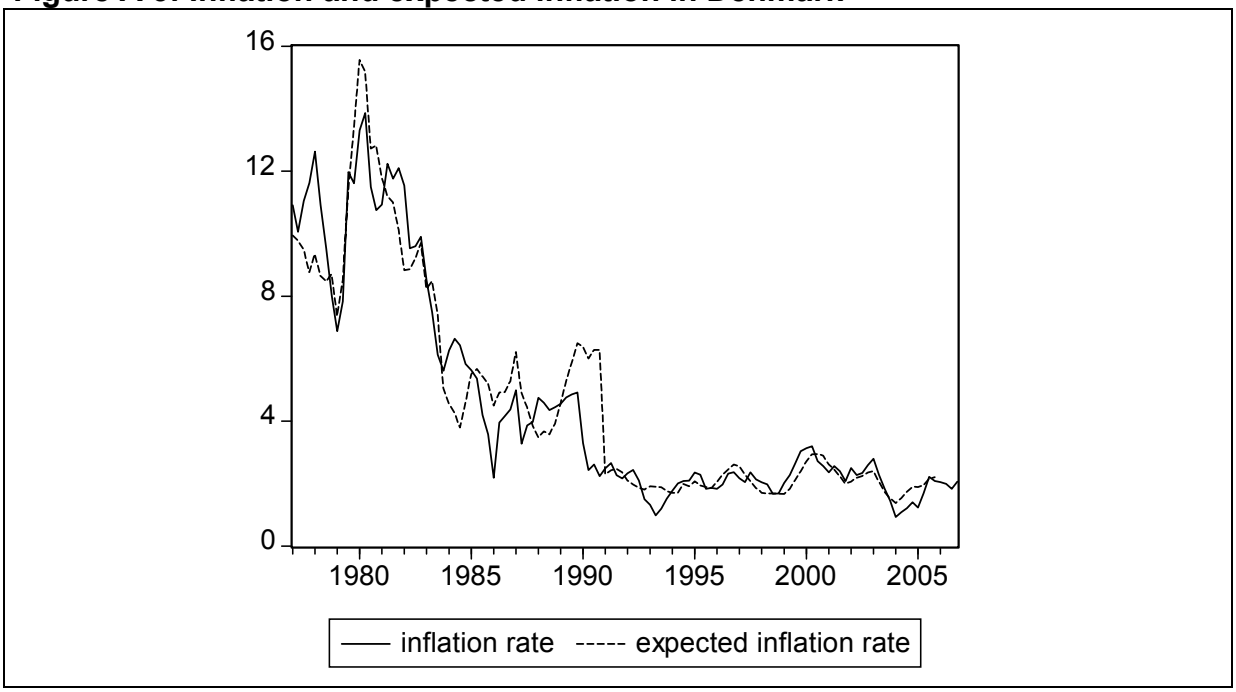


Table A 1: VAR for expected inflation in Sweden 1973q1-1990q4

Included observations: 72 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	I_N	INFL	YGAP_BP
I_N(-1)	0.722660	0.166432	43.71271
	(0.08364)	(0.05779)	(176.333)
	[8.64013]	[2.87992]	[0.24790]
I_N(-4)	0.062549	0.020863	390.2879
	(0.09731)	(0.06723)	(205.149)
	[0.64279]	[0.31030]	[1.90246]
I_N(-6)	-0.177790	-0.178216	127.7958
	(0.10986)	(0.07590)	(231.602)
	[-1.61839]	[-2.34790]	[0.55179]
I_N(-8)	0.360475	-0.107260	-676.2570
	(0.09848)	(0.06804)	(207.621)
	[3.66034]	[-1.57631]	[-3.25716]
INFL(-1)	0.059462	0.693201	-682.2933
	(0.14104)	(0.09745)	(297.348)
	[0.42160]	[7.11329]	[-2.29459]
INFL(-4)	0.206091	-0.284954	317.7006
	(0.15145)	(0.10464)	(319.285)
	[1.36082]	[-2.72315]	[0.99504]

INFL(-6)	-0.316518	0.203685	447.7090
	(0.16281)	(0.11250)	(343.251)
	[-1.94405]	[1.81061]	[1.30432]
INFL(-8)	0.147702	0.113173	-200.8308
	(0.11609)	(0.08021)	(244.748)
	[1.27229]	[1.41091]	[-0.82056]
YGAP_BP(-1)	1.17E-05	-3.85E-07	1.002270
	(1.4E-05)	(9.6E-06)	(0.02914)
	[0.84666]	[-0.04033]	[34.3935]
YGAP_BP(-4)	2.26E-06	1.53E-05	-0.495671
	(2.1E-05)	(1.5E-05)	(0.04451)
	[0.10713]	[1.04799]	[-11.1366]
YGAP_BP(-6)	3.15E-05	-4.56E-06	0.463516
	(2.7E-05)	(1.8E-05)	(0.05625)
	[1.18048]	[-0.24719]	[8.23983]
YGAP_BP(-8)	-2.49E-05	3.89E-06	-0.459930
	(2.2E-05)	(1.5E-05)	(0.04571)
	[-1.14650]	[0.25979]	[-10.0623]
C	-0.485106	2.684041	2125.888
	(1.07884)	(0.74542)	(2274.45)
	[-0.44965]	[3.60071]	[0.93468]
INFL_ENERGY	0.023009	0.040067	-13.17912
	(0.02291)	(0.01583)	(48.3089)
	[1.00414]	[2.53067]	[-0.27281]
R-squared	0.854840	0.898702	0.972738
Adj. R-squared	0.822304	0.875997	0.966627
Sum sq. resids	113.7602	54.30951	5.06E+08
S.E. equation	1.400494	0.967663	2952.571
F-statistic	26.27373	39.58200	159.1922
Log likelihood	-118.6309	-92.01277	-669.6906
Akaike AIC	3.684192	2.944799	18.99141
Schwarz SC	4.126877	3.387484	19.43409
Mean dependent	9.806529	8.617645	1739.165
S.D. dependent	3.322325	2.747942	16162.40

Determinant resid covariance (dof adj.)	15477834
Determinant resid covariance	8090897.
Log likelihood	-879.1157
Akaike information criterion	25.58655
Schwarz criterion	26.91460

Table A 2: VAR for expected inflation in Sweden 1991q1-2006q2

Included observations: 62 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	I_N	INFL	YGAP_BP
I_N(-1)	0.942467	-0.034697	-42.65530
	(0.13589)	(0.11541)	(94.2021)
	[6.93545]	[-0.30064]	[-0.45281]
I_N(-2)	-0.232141	0.417463	153.8423
	(0.18227)	(0.15480)	(126.351)
	[-1.27362]	[2.69682]	[1.21758]
I_N(-3)	0.156063	-0.308586	-129.9072
	(0.17529)	(0.14887)	(121.512)
	[0.89032]	[-2.07286]	[-1.06909]
I_N(-4)	0.017884	0.406955	95.91435
	(0.17106)	(0.14528)	(118.583)
	[0.10455]	[2.80116]	[0.80884]
I_N(-5)	-0.025058	-0.409546	-22.09981
	(0.12010)	(0.10200)	(83.2544)
	[-0.20865]	[-4.01521]	[-0.26545]
INFL(-1)	0.135130	0.863724	-1.596388
	(0.13947)	(0.11845)	(96.6823)
	[0.96889]	[7.29191]	[-0.01651]
INFL(-2)	-0.420436	-0.170090	-86.30961
	(0.17365)	(0.14748)	(120.378)
	[-2.42115]	[-1.15331]	[-0.71699]
INFL(-3)	0.552953	0.266547	33.79726
	(0.17146)	(0.14562)	(118.858)
	[3.22500]	[1.83045]	[0.28435]
INFL(-4)	-0.383228	-0.429189	161.2369
	(0.17794)	(0.15112)	(123.352)
	[-2.15368]	[-2.83999]	[1.30713]
INFL(-5)	0.236129	0.221812	-204.1087
	(0.11874)	(0.10085)	(82.3153)
	[1.98856]	[2.19947]	[-2.47960]
YGAP_BP(-1)	-9.44E-06	0.000376	4.042659
	(0.00015)	(0.00013)	(0.10350)
	[-0.06323]	[2.96184]	[39.0588]
YGAP_BP(-2)	0.000133	-0.001270	-7.166343

	(0.00049)	(0.00041)	(0.33745)
	[0.27353]	[-3.07142]	[-21.2367]
YGAP_BP(-3)	-0.000245	0.001847	6.937064
	(0.00068)	(0.00057)	(0.46819)
	[-0.36297]	[3.21921]	[14.8167]
YGAP_BP(-4)	0.000182	-0.001354	-3.653619
	(0.00047)	(0.00040)	(0.32746)
	[0.38579]	[-3.37608]	[-11.1574]
YGAP_BP(-5)	-5.49E-05	0.000419	0.828526
	(0.00014)	(0.00012)	(0.09911)
	[-0.38404]	[3.44768]	[8.35961]
C	0.468701	-0.209128	-114.9551
	(0.21986)	(0.18672)	(152.411)
	[2.13182]	[-1.11998]	[-0.75425]
INFL_ENERGY	-0.035550	0.059149	7.637643
	(0.02111)	(0.01793)	(14.6310)
	[-1.68436]	[3.29978]	[0.52202]
R-squared	0.971845	0.959592	0.999699
Adj. R-squared	0.961834	0.945225	0.999592
Sum sq. resids	19.46494	14.03991	9353859.
S.E. equation	0.657689	0.558568	455.9205
F-statistic	97.07979	66.79030	9350.955
Log likelihood	-52.06008	-41.93204	-457.6233
Akaike AIC	2.227745	1.901034	15.31043
Schwarz SC	2.810991	2.484280	15.89368
Mean dependent	5.550338	2.025263	-1852.226
S.D. dependent	3.366521	2.386626	22582.79

Determinant resid covariance (dof adj.)	21507.96
Determinant resid covariance	8223.594
Log likelihood	-543.3802
Akaike information criterion	19.17356
Schwarz criterion	20.92329

Table A 3: VAR for expected inflation in Finland 1972q1-1992q4

Included observations: 84 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	I_N	INFL	YGAP_BP
I_N(-1)	0.692434	-0.005723	-1.118227
	(0.08824)	(0.05387)	(16.3467)
	[7.84680]	[-0.10622]	[-0.06841]
I_N(-4)	0.082287	-0.121183	-18.41855
	(0.09985)	(0.06096)	(18.4962)
	[0.82412]	[-1.98796]	[-0.99580]
INFL(-1)	0.081621	0.894064	11.77606
	(0.11770)	(0.07186)	(21.8035)
	[0.69346]	[12.4420]	[0.54010]
INFL(-4)	-0.066335	-0.010012	-2.508922
	(0.09559)	(0.05836)	(17.7066)
	[-0.69398]	[-0.17156]	[-0.14169]
YGAP_BP(-1)	0.000298	0.000145	1.151012
	(0.00013)	(7.8E-05)	(0.02368)
	[2.33209]	[1.86111]	[48.6161]
YGAP_BP(-4)	2.50E-05	-0.000109	-0.333136
	(0.00015)	(9.0E-05)	(0.02741)
	[0.16928]	[-1.20730]	[-12.1530]
C	2.831824	2.038263	178.1433
	(1.22188)	(0.74597)	(226.345)
	[2.31760]	[2.73236]	[0.78704]
INFL_ENERGY	-0.033208	0.041132	-2.941637
	(0.02261)	(0.01380)	(4.18849)
	[-1.46868]	[2.97971]	[-0.70231]
R-squared	0.717148	0.966616	0.979753
Adj. R-squared	0.691096	0.963541	0.977889
Sum sq. resids	136.7318	50.96322	4691981.
S.E. equation	1.341306	0.818883	248.4685
F-statistic	27.52737	314.3611	525.3880
Log likelihood	-139.6534	-98.20291	-578.2739
Akaike AIC	3.515557	2.528641	13.95890
Schwarz SC	3.747064	2.760147	14.19041
Mean dependent	11.73106	8.518691	35.58682
S.D. dependent	2.413325	4.288635	1670.948
Determinant resid covariance (dof adj.)		66547.28	

Determinant resid covariance	49287.10
Log likelihood	-811.4000
Akaike information criterion	19.89048
Schwarz criterion	20.58500

Table A 4: VAR for expected inflation in Finland 1993q1-2006q4

Included observations: 56
Standard errors in ( ) & t-statistics in [ ]

	I_N	INFL	YGAP_BP
I_N(-1)	0.638070	-0.023009	-239.2592
	(0.04472)	(0.05302)	(62.4796)
	[14.2683]	[-0.43394]	[-3.82939]
I_N(-6)	-0.118398	-0.195163	62.38872
	(0.04020)	(0.04766)	(56.1621)
	[-2.94540]	[-4.09462]	[1.11087]
I_N(-8)	0.197710	0.186252	93.27762
	(0.04014)	(0.04759)	(56.0814)
	[4.92553]	[3.91328]	[1.66325]
INFL(-1)	0.299327	0.877145	205.1976
	(0.06726)	(0.07975)	(93.9744)
	[4.45020]	[10.9982]	[2.18355]
INFL(-6)	-0.108115	0.249397	-221.7738
	(0.06512)	(0.07722)	(90.9868)
	[-1.66017]	[3.22978]	[-2.43743]
INFL(-8)	-0.007943	-0.228286	43.78698
	(0.06654)	(0.07889)	(92.9623)
	[-0.11937]	[-2.89356]	[0.47102]
YGAP_BP(-1)	5.82E-05	4.37E-05	0.948951
	(3.9E-05)	(4.6E-05)	(0.05469)
	[1.48763]	[0.94126]	[17.3518]
YGAP_BP(-6)	0.000116	-3.22E-05	0.087465
	(6.0E-05)	(7.1E-05)	(0.08322)
	[1.93964]	[-0.45567]	[1.05106]
YGAP_BP(-8)	-0.000157	3.76E-05	-0.219587
	(5.6E-05)	(6.7E-05)	(0.07864)
	[-2.78384]	[0.56360]	[-2.79234]
C	0.524198	0.064823	41.63443
	(0.10554)	(0.12514)	(147.452)
	[4.96693]	[0.51801]	[0.28236]

INFL_ENERGY	0.018613	0.042781	45.73087
	(0.00794)	(0.00942)	(11.0975)
	[2.34328]	[4.54243]	[4.12083]
R-squared	0.974891	0.885703	0.930469
Adj. R-squared	0.969311	0.860303	0.915018
Sum sq. resids	3.500198	4.921066	6832484.
S.E. equation	0.278895	0.330692	389.6575
F-statistic	174.7182	34.87104	60.21959
Log likelihood	-1.829652	-11.36941	-407.3923
Akaike AIC	0.458202	0.798908	14.94258
Schwarz SC	0.856039	1.196744	15.34042
Mean dependent	3.851143	1.347977	128.0379
S.D. dependent	1.592024	0.884770	1336.656
Determinant resid covariance (dof adj.)			1010.985
Determinant resid covariance			524.5878
Log likelihood			-413.7348
Akaike information criterion			15.95482
Schwarz criterion			17.14833

Table A 5: VAR for expected inflation in Denmark 1973q3-1989q4

Included observations: 66 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	I_N	INFL	YGAP_BP
I_N(-1)	0.451801	0.023193	-119.1142
	(0.13563)	(0.07323)	(59.4998)
	[3.33118]	[0.31673]	[-2.00193]
I_N(-2)	0.201609	0.133550	-76.00755
	(0.14752)	(0.07965)	(64.7174)
	[1.36664]	[1.67676]	[-1.17445]
I_N(-5)	0.068089	-0.031988	108.6802
	(0.15004)	(0.08101)	(65.8238)
	[0.45380]	[-0.39486]	[1.65108]
I_N(-6)	0.046772	-0.194803	92.42072
	(0.13254)	(0.07156)	(58.1462)
	[0.35288]	[-2.72221]	[1.58945]
INFL(-1)	0.700617	0.594854	-10.46903
	(0.25691)	(0.13870)	(112.704)
	[2.72713]	[4.28863]	[-0.09289]
INFL(-2)	-0.657171	-0.124600	277.4494

	(0.26811)	(0.14476)	(117.621)
	[-2.45109]	[-0.86076]	[2.35884]
INFL(-5)	0.306216	0.143212	-229.5058
	(0.25752)	(0.13904)	(112.975)
	[1.18908]	[1.03002]	[-2.03147]
INFL(-6)	-0.430916	0.108989	58.93929
	(0.25020)	(0.13509)	(109.763)
	[-1.72227]	[0.80682]	[0.53697]
YGAP_BP(-1)	8.78E-05	-5.80E-05	2.244348
	(0.00012)	(6.7E-05)	(0.05461)
	[0.70552]	[-0.86363]	[41.1002]
YGAP_BP(-2)	-0.000101	7.96E-05	-1.530792
	(0.00016)	(8.7E-05)	(0.07091)
	[-0.62765]	[0.91250]	[-21.5873]
YGAP_BP(-5)	4.45E-06	-9.92E-05	0.605227
	(0.00015)	(8.1E-05)	(0.06569)
	[0.02972]	[-1.22733]	[9.21362]
YGAP_BP(-6)	-6.31E-05	6.23E-05	-0.390445
	(0.00011)	(6.0E-05)	(0.04869)
	[-0.56834]	[1.04009]	[-8.01881]
C	2.833927	1.907242	-514.0648
	(1.16246)	(0.62762)	(509.970)
	[2.43787]	[3.03886]	[-1.00803]
INFL_ENERGY	0.064804	0.083319	-25.02885
	(0.02533)	(0.01368)	(11.1141)
	[2.55798]	[6.09142]	[-2.25200]
R-squared	0.733747	0.924415	0.996412
Adj. R-squared	0.667184	0.905518	0.995515
Sum sq. resids	222.7357	64.92672	42866900
S.E. equation	2.069632	1.117404	907.9446
F-statistic	11.02330	48.92041	1110.902
Log likelihood	-133.7889	-93.10889	-535.3205
Akaike AIC	4.478450	3.245724	16.64608
Schwarz SC	4.942923	3.710196	17.11055
Mean dependent	12.01864	8.433744	-1091.925
S.D. dependent	3.587491	3.635270	13557.91

Determinant resid covariance (dof adj.)	3703869.
Determinant resid covariance	1811481.
Log likelihood	-756.4685
Akaike information criterion	24.19601

Schwarz criterion	25.58943

Table A 6: VAR for expected inflation in Denmark 1990q1-2006q4

Included observations: 68
Standard errors in ( ) & t-statistics in [ ]

	I_N	INFL	YGAP_BP
I_N(-1)	0.527397	-0.066045	-214.7188
	(0.12715)	(0.02643)	(117.328)
	[4.14796]	[-2.49928]	[-1.83007]
I_N(-2)	0.434920	0.009379	156.6231
	(0.15564)	(0.03235)	(143.626)
	[2.79433]	[0.28994]	[1.09050]
I_N(-4)	-0.087348	0.045937	258.9607
	(0.14969)	(0.03111)	(138.136)
	[-0.58351]	[1.47651]	[1.87468]
I_N(-8)	0.033710	0.013823	-98.26480
	(0.09304)	(0.01934)	(85.8578)
	[0.36231]	[0.71480]	[-1.14451]
INFL(-1)	0.137051	0.602874	779.4239
	(0.55782)	(0.11594)	(514.746)
	[0.24569]	[5.20010]	[1.51419]
INFL(-2)	0.339873	-0.013846	-273.5072
	(0.56997)	(0.11846)	(525.956)
	[0.59630]	[-0.11688]	[-0.52002]
INFL(-4)	-0.279051	-0.011294	-454.3298
	(0.34735)	(0.07219)	(320.529)
	[-0.80337]	[-0.15644]	[-1.41744]
INFL(-8)	0.116934	0.098063	-99.29153
	(0.22840)	(0.04747)	(210.766)
	[0.51197]	[2.06576]	[-0.47110]
YGAP_BP(-1)	-1.21E-05	1.83E-06	2.035467
	(6.7E-05)	(1.4E-05)	(0.06178)
	[-0.18099]	[0.13142]	[32.9482]
YGAP_BP(-2)	6.68E-05	7.01E-06	-1.361193
	(8.9E-05)	(1.9E-05)	(0.08258)
	[0.74694]	[0.37669]	[-16.4843]
YGAP_BP(-4)	-5.35E-05	-1.91E-07	0.277537
	(3.8E-05)	(7.9E-06)	(0.03497)

	[-1.41276]	[-0.02429]	[7.93561]
YGAP_BP(-8)	-2.94E-06	1.76E-07	-0.089553
	(1.5E-05)	(3.2E-06)	(0.01411)
	[-0.19235]	[0.05541]	[-6.34575]
C	-0.328204	0.454069	-635.2763
	(0.68313)	(0.14198)	(630.382)
	[-0.48044]	[3.19813]	[-1.00776]
INFL_ENERGY	-0.014542	0.048439	77.48336
	(0.05019)	(0.01043)	(46.3179)
	[-0.28973]	[4.64331]	[1.67286]
R-squared	0.912628	0.837812	0.993949
Adj. R-squared	0.891595	0.798767	0.992492
Sum sq. resids	65.54713	2.831375	55815389
S.E. equation	1.101742	0.228982	1016.670
F-statistic	43.38849	21.45746	682.2785
Log likelihood	-95.23872	11.58952	-559.5016
Akaike AIC	3.212903	0.070896	16.86769
Schwarz SC	3.669861	0.527854	17.32465
Mean dependent	5.560978	2.109162	346.5437
S.D. dependent	3.346220	0.510449	11733.11
Determinant resid covariance (dof adj.)		52760.91	
Determinant resid covariance		26422.07	
Log likelihood		-635.6499	
Akaike information criterion		19.93088	
Schwarz criterion		21.30175	

Table A 7: Test for stationarity of the variables in the VARs for Macroeconomic Policy

Country	4. Variable	ADF (t-statistics)
Sweden	$\hat{y}^r$	-3.128***
	monetary-indicator	-9.259***
	fiscal indicator	-4.195***
	wage indicator	-3.004***
	reer_cycle	-4.285***
Finland	$\hat{y}^r$	-3.528***
	monetary-indicator	-4.767***
	fiscal indicator	-6.089***
	wage indicator	-2.622***
	reer_cycle	-4.916***
Denmark	$\hat{y}^r$	-1.727*
	monetary-indicator	-7.076***
	fiscal indicator	-3.837***
	wage indicator	-2.526***
	reer_cycle	-4.701***

Notes: Null hypothesis: The variable has a unit root. ADF Test without intercept or trend. *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level.

Table A 8: VAR I for Macroeconomic Policy in Sweden 1976q2 – 1990q4

Included observations: 59 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GR_Y	MONETARY-IND	FISCALIND	WAGEIND	REER_CYCLE
GR_Y(-1)	-0.802044	0.269861	-0.020025	0.173296	0.723062
	(0.16388)	(0.19508)	(0.04923)	(0.22963)	(0.57431)
	[-4.89403]	[1.38334]	[-0.40679]	[0.75467]	[1.25901]
GR_Y(-2)	-0.402594	0.584175	-0.078371	0.446149	0.974824
	(0.20067)	(0.23888)	(0.06028)	(0.28118)	(0.70324)
	[-2.00620]	[2.44552]	[-1.30016]	[1.58668]	[1.38619]
GR_Y(-3)	-0.172106	0.216765	-0.044027	0.486385	1.574966
	(0.22353)	(0.26608)	(0.06714)	(0.31321)	(0.78334)
	[-0.76994]	[0.81465]	[-0.65571]	[1.55291]	[2.01058]
GR_Y(-4)	0.107392	0.298662	0.034114	0.613831	1.189689
	(0.19863)	(0.23644)	(0.05966)	(0.27832)	(0.69607)
	[0.54067]	[1.26316]	[0.57176]	[2.20551]	[1.70914]
GR_Y(-5)	0.026589	-0.053719	0.036998	0.429297	0.212254
	(0.14188)	(0.16888)	(0.04262)	(0.19880)	(0.49719)
	[0.18741]	[-0.31808]	[0.86816]	[2.15948]	[0.42691]
MONETARYIND(-1)	0.163534	0.511157	0.044453	-0.069190	-0.236938
	(0.14292)	(0.17013)	(0.04293)	(0.20027)	(0.50087)
	[1.14420]	[3.00446]	[1.03543]	[-0.34549]	[-0.47306]
MONETARYIND(-2)	-0.117534	-0.376913	-0.099257	-0.018299	-1.130708
	(0.16057)	(0.19114)	(0.04823)	(0.22499)	(0.56270)
	[-0.73198]	[-1.97196]	[-2.05792]	[-0.08133]	[-2.00944]
MONETARYIND(-3)	0.123367	0.093743	0.047698	-0.489161	-0.998631
	(0.15861)	(0.18881)	(0.04764)	(0.22225)	(0.55584)
	[0.77779]	[0.49650]	[1.00114]	[-2.20098]	[-1.79661]
MONETARYIND(-4)	-0.161320	-0.410038	-0.022807	0.473799	0.177983
	(0.17567)	(0.20911)	(0.05277)	(0.24614)	(0.61560)
	[-0.91834]	[-1.96091]	[-0.43222]	[1.92491]	[0.28912]
MONETARYIND(-5)	-0.011893	0.199932	-0.144533	-0.159753	0.437746
	(0.16006)	(0.19052)	(0.04808)	(0.22427)	(0.56090)
	[-0.07430]	[1.04938]	[-3.00627]	[-0.71233]	[0.78044]
FISCALIND(-1)	-0.749996	0.119305	2.150236	-1.545750	1.512666
	(0.48601)	(0.57853)	(0.14599)	(0.68100)	(1.70318)
	[-1.54316]	[0.20622]	[14.7289]	[-2.26984]	[0.88814]

FISCALIND(-2)	0.777119	0.412729	-1.630948	2.526223	-2.662375
	(1.19406)	(1.42137)	(0.35867)	(1.67311)	(4.18446)
	[0.65082]	[0.29037]	[-4.54720]	[1.50990]	[-0.63625]
FISCALIND(-3)	0.321694	-0.298145	0.089916	-0.993567	-0.806882
	(1.47822)	(1.75962)	(0.44403)	(2.07127)	(5.18028)
	[0.21762]	[-0.16944]	[0.20250]	[-0.47969]	[-0.15576]
FISCALIND(-4)	-1.253363	0.062535	0.461879	-0.425129	5.751974
	(1.14860)	(1.36725)	(0.34501)	(1.60940)	(4.02514)
	[-1.09121]	[0.04574]	[1.33873]	[-0.26415]	[1.42901]
FISCALIND(-5)	0.824381	0.249061	-0.143105	0.298741	-4.016327
	(0.48981)	(0.58305)	(0.14713)	(0.68631)	(1.71647)
	[1.68308]	[0.42717]	[-0.97266]	[0.43528]	[-2.33987]
WAGEIND(-1)	0.038660	-0.035685	0.039805	0.811166	0.006775
	(0.10432)	(0.12417)	(0.03133)	(0.14617)	(0.36556)
	[0.37060]	[-0.28738]	[1.27034]	[5.54961]	[0.01853]
WAGEIND(-2)	0.057256	0.108272	-0.107012	-0.079844	-0.009440
	(0.11616)	(0.13827)	(0.03489)	(0.16276)	(0.40708)
	[0.49290]	[0.78303]	[-3.06690]	[-0.49055]	[-0.02319]
WAGEIND(-3)	-0.189590	-0.050032	0.121956	0.068128	0.027897
	(0.10658)	(0.12686)	(0.03201)	(0.14933)	(0.37348)
	[-1.77893]	[-0.39438]	[3.80959]	[0.45622]	[0.07469]
WAGEIND(-4)	-0.123113	0.118676	-0.077460	-0.467406	-0.119682
	(0.09456)	(0.11257)	(0.02841)	(0.13250)	(0.33139)
	[-1.30189]	[1.05429]	[-2.72697]	[-3.52753]	[-0.36115]
WAGEIND(-5)	0.068743	0.124968	0.009315	0.435740	0.321108
	(0.08895)	(0.10588)	(0.02672)	(0.12463)	(0.31170)
	[0.77286]	[1.18029]	[0.34866]	[3.49625]	[1.03017]
REER_CYCLE(-1)	0.024784	-0.016192	-0.022320	-0.021602	0.291391
	(0.04664)	(0.05552)	(0.01401)	(0.06536)	(0.16346)
	[0.53134]	[-0.29162]	[-1.59306]	[-0.33051]	[1.78264]
REER_CYCLE(-2)	-0.101516	-0.048951	-0.006180	-0.042289	0.209314
	(0.04911)	(0.05846)	(0.01475)	(0.06881)	(0.17210)
	[-2.06719]	[-0.83739]	[-0.41894]	[-0.61458]	[1.21627]
REER_CYCLE(-3)	0.037945	0.074143	-0.014445	-0.046587	0.041992
	(0.04989)	(0.05939)	(0.01499)	(0.06991)	(0.17485)
	[0.76050]	[1.24836]	[-0.96383]	[-0.66638]	[0.24016]
REER_CYCLE(-4)	-0.030643	0.037581	-0.016083	0.090037	0.013595
	(0.04838)	(0.05759)	(0.01453)	(0.06779)	(0.16955)
	[-0.63337]	[0.65255]	[-1.10668]	[1.32816]	[0.08018]

REER_CYCLE(-5)	-0.020957	0.026206	0.044783	0.005065	0.266450
	(0.04511)	(0.05370)	(0.01355)	(0.06321)	(0.15809)
	[-0.46455]	[0.48800]	[3.30476]	[0.08013]	[1.68538]
C	0.892108	-0.203215	0.014962	-1.487623	-1.713585
	(0.30746)	(0.36599)	(0.09235)	(0.43081)	(1.07746)
	[2.90154]	[-0.55525]	[0.16200]	[-3.45309]	[-1.59039]
R-squared	0.655242	0.599026	0.985565	0.883324	0.723912
Adj. R-squared	0.394061	0.295258	0.974629	0.794933	0.514754
Sum sq. resids	42.63680	60.41476	3.847001	83.71035	523.6127
S.E. equation	1.136672	1.353052	0.341432	1.592695	3.983347
F-statistic	2.508770	1.971987	90.12362	9.993390	3.461085
Log likelihood	-74.13519	-84.41640	-3.175185	-94.03722	-148.1222
Akaike AIC	3.394413	3.742929	0.988989	4.069058	5.902448
Schwarz SC	4.309938	4.658454	1.904514	4.984583	6.817973
Mean dependent	0.489492	0.055771	-0.310463	-1.148017	0.274881
S.D. dependent	1.460229	1.611757	2.143566	3.517102	5.718305
Determinant resid covariance (dof adj.)		7.216876			
Determinant resid covariance		0.395056			
Log likelihood		-391.1894			
Akaike information criterion		17.66744			
Schwarz criterion		22.24506			

Figure A 4: AR Roots for VAR I for Macroeconomic Policy in Sweden 1976q2 – 1990q4

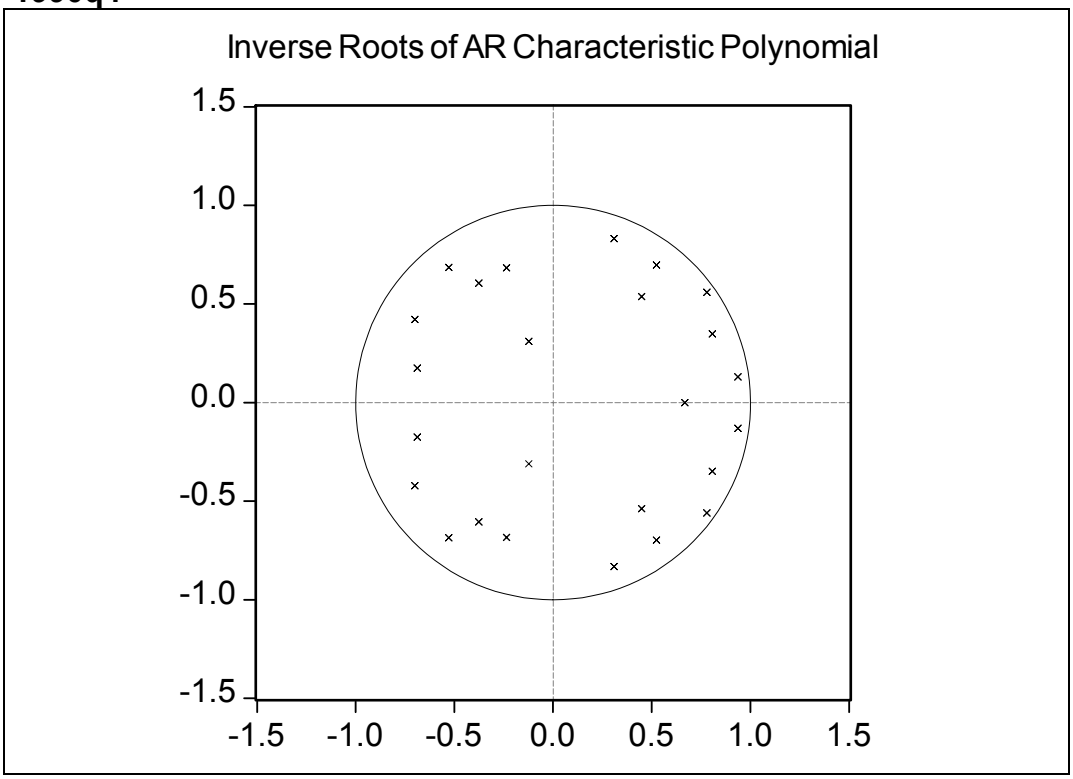


Table A 9: VAR Residual Serial Correlation LM Tests for VAR I for Macroeconomic Policy in Sweden 1976q2 – 1990q4

H0: no serial correlation at lag order h
Included observations: 59

Lags	LM-Stat	Prob
1	35.75206	0.0754
2	31.71064	0.1666
3	24.07232	0.5152
4	17.72961	0.8537
5	32.64554	0.1402
6	26.12277	0.4011
7	16.39475	0.9026
8	14.99657	0.9415
9	36.20186	0.0686
10	24.69445	0.4796
11	23.18170	0.5670
12	33.52356	0.1185

Probs from chi-square with 25 df.

Table A 10: VAR Residual Normality Tests for VAR I for Macroeconomic Policy in Sweden 1976q2 – 1990q4

Orthogonalization: Residual Covariance (Urzua)
H0: residuals are multivariate normal
Included observations: 59

Component	Skewness	Chi-sq	df	Prob.
1	-0.072296	0.056851	1	0.8115
2	-0.064140	0.044748	1	0.8325
3	0.248728	0.672926	1	0.4120
4	0.106270	0.122839	1	0.7260
5	0.173038	0.325687	1	0.5682
Joint		1.223051	5	0.9426

Component	Kurtosis	Chi-sq	df	Prob.
1	0.791391	14.05206	1	0.0002
2	1.031913	11.02915	1	0.0009
3	1.007400	11.32050	1	0.0008
4	1.670468	4.777796	1	0.0288
5	1.745608	4.211675	1	0.0401
Joint		45.39119	5	0.0000

Component	Jarque-Bera	df	Prob.
1	14.10891	2	0.0009
2	11.07390	2	0.0039
3	11.99343	2	0.0025
4	4.900635	2	0.0863
5	4.537362	2	0.1034
Joint	128.6142	105	0.0586

Table A 11: VAR II for Macroeconomic Policy in Sweden 1991q1 – 2006q2

Included observations: 62 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GR_Y	MONETARY-IND	FISCALIND	WAGEIND	REER_CYCLE
GR_Y(-1)	0.161058	-0.287607	-0.248534	-0.267620	-0.375617
	(0.14696)	(0.21909)	(0.07128)	(0.32336)	(1.03828)
	[1.09593]	[-1.31272]	[-3.48672]	[-0.82762]	[-0.36177]
GR_Y(-2)	0.392787	0.290400	-0.072495	0.161112	1.460515

	(0.15729)	(0.23449)	(0.07629)	(0.34609)	(1.11125)
	[2.49724]	[1.23844]	[-0.95026]	[0.46553]	[1.31430]
GR_Y(-3)	0.088123	0.264326	-0.056349	-0.096950	1.002659
	(0.12703)	(0.18938)	(0.06161)	(0.27951)	(0.89748)
	[0.69371]	[1.39574]	[-0.91455]	[-0.34686]	[1.11720]
GR_Y(-4)	-0.110206	0.489323	-0.096266	0.572241	-2.087988
	(0.13350)	(0.19903)	(0.06475)	(0.29375)	(0.94320)
	[-0.82550]	[2.45858]	[-1.48669]	[1.94807]	[-2.21374]
GR_Y(-5)	0.623079	0.084659	0.081380	0.120091	1.432418
	(0.15170)	(0.22616)	(0.07358)	(0.33379)	(1.07176)
	[4.10734]	[0.37434]	[1.10602]	[0.35978]	[1.33651]
GR_Y(-6)	-0.256419	0.521483	-0.119779	0.602582	-0.322189
	(0.15186)	(0.22640)	(0.07366)	(0.33414)	(1.07290)
	[-1.68852]	[2.30341]	[-1.62619]	[1.80337]	[-0.30030]
MONETARYIND(-1)	-0.092369	0.443626	0.054518	0.208084	0.947598
	(0.09559)	(0.14251)	(0.04637)	(0.21034)	(0.67538)
	[-0.96626]	[3.11285]	[1.17582]	[0.98928]	[1.40306]
MONETARYIND(-2)	-0.242875	-0.266895	-0.106944	-0.021503	-0.548887
	(0.09570)	(0.14266)	(0.04642)	(0.21056)	(0.67609)
	[-2.53800]	[-1.87078]	[-2.30409]	[-0.10212]	[-0.81185]
MONETARYIND(-3)	-0.054159	-0.345808	-0.021912	-0.197608	-0.076500
	(0.09951)	(0.14835)	(0.04826)	(0.21895)	(0.70301)
	[-0.54427]	[-2.33110]	[-0.45401]	[-0.90254]	[-0.10882]
MONETARYIND(-4)	0.079747	-0.479719	-0.003940	-0.125038	0.881660
	(0.09133)	(0.13615)	(0.04430)	(0.20095)	(0.64523)
	[0.87321]	[-3.52342]	[-0.08894]	[-0.62224]	[1.36643]
MONETARYIND(-5)	-0.059613	0.388573	-0.038195	0.292031	0.645048
	(0.08735)	(0.13023)	(0.04237)	(0.19221)	(0.61716)
	[-0.68243]	[2.98378]	[-0.90149]	[1.51936]	[1.04519]
MONETARYIND(-6)	0.007866	-0.198324	-0.024962	0.067561	0.054886
	(0.08574)	(0.12782)	(0.04159)	(0.18866)	(0.60575)
	[0.09174]	[-1.55156]	[-0.60026]	[0.35812]	[0.09061]
FISCALIND(-1)	0.676198	-0.253349	2.090045	-0.588935	-2.692458
	(0.32039)	(0.47764)	(0.15540)	(0.70496)	(2.26355)
	[2.11056]	[-0.53042]	[13.4497]	[-0.83542]	[-1.18948]
FISCALIND(-2)	-1.890599	2.007916	-2.086328	1.856296	12.07173
	(0.72296)	(1.07780)	(0.35066)	(1.59075)	(5.10773)
	[-2.61509]	[1.86298]	[-5.94979]	[1.16693]	[2.36342]

FISCALIND(-3)	2.727567	-2.693391	1.469426	-2.612241	-20.60296
	(0.93459)	(1.39330)	(0.45330)	(2.05641)	(6.60291)
	[2.91847]	[-1.93310]	[3.24160]	[-1.27029]	[-3.12028]
FISCALIND(-4)	-1.730266	1.394159	-1.033259	3.667265	18.77533
	(1.05265)	(1.56932)	(0.51057)	(2.31619)	(7.43704)
	[-1.64372]	[0.88839]	[-2.02375]	[1.58332]	[2.52457]
FISCALIND(-5)	0.264494	0.005736	0.606468	-3.443062	-10.15511
	(0.81536)	(1.21556)	(0.39548)	(1.79407)	(5.76058)
	[0.32439]	[0.00472]	[1.53352]	[-1.91913]	[-1.76286]
FISCALIND(-6)	0.180458	-0.228109	-0.171729	1.379778	2.890939
	(0.29561)	(0.44070)	(0.14338)	(0.65044)	(2.08849)
	[0.61046]	[-0.51761]	[-1.19773]	[2.12131]	[1.38423]
WAGEIND(-1)	0.158226	0.268134	-0.036477	0.756979	-0.875215
	(0.08315)	(0.12396)	(0.04033)	(0.18295)	(0.58743)
	[1.90300]	[2.16315]	[-0.90451]	[4.13766]	[-1.48991]
WAGEIND(-2)	0.111449	-0.017127	0.177494	0.243693	1.166464
	(0.10889)	(0.16233)	(0.05281)	(0.23959)	(0.76928)
	[1.02354]	[-0.10551]	[3.36081]	[1.01714]	[1.51630]
WAGEIND(-3)	-0.233640	-0.117825	-0.131288	0.192851	-0.727697
	(0.10127)	(0.15098)	(0.04912)	(0.22284)	(0.71551)
	[-2.30700]	[-0.78039]	[-2.67274]	[0.86543]	[-1.01704]
WAGEIND(-4)	0.027066	-0.151178	0.007805	-0.712729	-0.914364
	(0.07931)	(0.11824)	(0.03847)	(0.17452)	(0.56036)
	[0.34125]	[-1.27852]	[0.20289]	[-4.08396]	[-1.63173]
WAGEIND(-5)	0.095520	-0.095585	-0.048392	0.258516	0.564445
	(0.08227)	(0.12266)	(0.03991)	(0.18103)	(0.58128)
	[1.16099]	[-0.77929]	[-1.21266]	[1.42801]	[0.97104]
WAGEIND(-6)	-0.065488	-0.041998	0.041546	0.104271	1.001253
	(0.07603)	(0.11335)	(0.03688)	(0.16730)	(0.53718)
	[-0.86131]	[-0.37051]	[1.12657]	[0.62327]	[1.86392]
REER_CYCLE(-1)	-0.044411	0.038758	-0.035709	0.048673	1.199106
	(0.02476)	(0.03691)	(0.01201)	(0.05448)	(0.17493)
	[-1.79360]	[1.04996]	[-2.97338]	[0.89339]	[6.85460]
REER_CYCLE(-2)	-0.003845	-0.089440	0.009225	-0.124719	-0.598015
	(0.03908)	(0.05826)	(0.01896)	(0.08599)	(0.27611)
	[-0.09839]	[-1.53512]	[0.48665]	[-1.45037]	[-2.16587]
REER_CYCLE(-3)	0.056032	0.114999	-0.006284	0.126061	0.682683
	(0.03398)	(0.05066)	(0.01648)	(0.07477)	(0.24008)
	[1.64889]	[2.26998]	[-0.38123]	[1.68596]	[2.84353]

REER_CYCLE(-4)	0.044156	-0.001871	0.014861	-0.091560	-0.460585
	(0.03083)	(0.04596)	(0.01495)	(0.06783)	(0.21780)
	[1.43233]	[-0.04071]	[0.99387]	[-1.34979]	[-2.11469]
REER_CYCLE(-5)	-0.037367	0.056041	-0.001301	0.077009	-0.128852
	(0.03120)	(0.04652)	(0.01513)	(0.06865)	(0.22044)
	[-1.19762]	[1.20480]	[-0.08596]	[1.12172]	[-0.58453]
REER_CYCLE(-6)	0.028477	-0.027507	-0.008871	0.012151	0.061683
	(0.02080)	(0.03101)	(0.01009)	(0.04577)	(0.14695)
	[1.36905]	[-0.88706]	[-0.87927]	[0.26549]	[0.41974]
C	0.104130	-0.925959	0.324908	-0.694999	-0.517267
	(0.18049)	(0.26908)	(0.08755)	(0.39715)	(1.27520)
	[0.57692]	[-3.44114]	[3.71133]	[-1.74998]	[-0.40564]
R-squared	0.880189	0.950058	0.997147	0.955179	0.911910
Adj. R-squared	0.764242	0.901727	0.994385	0.911805	0.826662
Sum sq. resids	3.388166	7.530360	0.797078	16.40370	169.1201
S.E. equation	0.330599	0.492864	0.160350	0.727428	2.335698
F-statistic	7.591330	19.65739	361.1174	22.02154	10.69712
Log likelihood	2.138025	-22.62025	46.99785	-46.75574	-119.0819
Akaike AIC	0.931031	1.729686	-0.516060	2.508250	4.841352
Schwarz SC	1.994599	2.793253	0.547508	3.571817	5.904919
Mean dependent	0.546797	-0.038621	0.350474	-1.063099	-0.163388
S.D. dependent	0.680876	1.572210	2.139982	2.449442	5.610090
Determinant resid covariance (dof adj.)		0.001285			
Determinant resid covariance		4.01E-05			
Log likelihood		-126.0571			
Akaike information criterion		9.066359			
Schwarz criterion		14.38420			

Figure A 5: AR Roots for VAR II for Macroeconomic Policy in Sweden 1991q1 – 2006q2

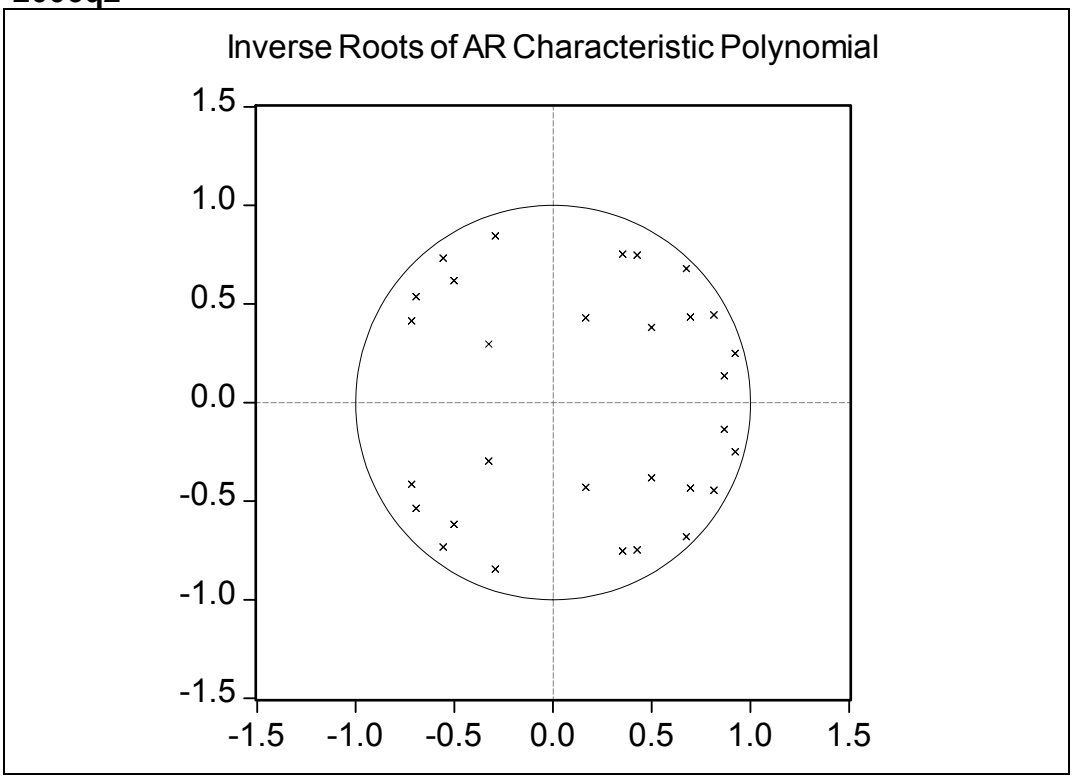


Table A 12: VAR Residual Serial Correlation LM Tests for VAR II for Macroeconomic Policy in Sweden 1991q1 – 2006q2

H0: no serial correlation at lag order h
Included observations: 62

Lags	LM-Stat	Prob
1	30.52829	0.2051
2	39.11340	0.0359
3	40.10301	0.0285
4	24.40053	0.4963
5	47.96018	0.0038
6	29.86370	0.2294
7	21.26818	0.6776
8	20.33861	0.7288
9	31.98535	0.1584
10	15.75565	0.9219
11	13.58515	0.9685
12	9.765176	0.9972

Probs from chi-square with 25 df.

Table A 13: VAR Residual Normality Tests for VAR II for Macroeconomic Policy in Sweden 1991q1 – 2006q2

Orthogonalization: Residual Covariance (Urzua)
H0: residuals are multivariate normal
Included observations: 62

Component	Skewness	Chi-sq	df	Prob.
1	0.046112	0.024186	1	0.8764
2	0.032619	0.012103	1	0.9124
3	-0.057676	0.037840	1	0.8458
4	0.148972	0.252441	1	0.6154
5	-0.105985	0.127774	1	0.7208
Joint		0.454344	5	0.9937

Component	Kurtosis	Chi-sq	df	Prob.
1	0.711771	15.78108	1	0.0001
2	0.588830	17.60008	1	0.0000
3	0.783343	14.76781	1	0.0001
4	1.043616	11.36643	1	0.0007
5	0.769331	14.96353	1	0.0001
Joint		74.47892	5	0.0000

Component	Jarque-Bera	df	Prob.
1	15.80526	2	0.0004
2	17.61219	2	0.0001
3	14.80565	2	0.0006
4	11.61887	2	0.0030
5	15.09130	2	0.0005
Joint	154.4011	105	0.0012

Table A 14: VAR I for Macroeconomic Policy in Finland 1975q4 – 1986q4

Included observations: 45 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GR_Y	MONETARY-IND	FISCALIND	WAGEIND	REER_CYCLE
GR_Y(-1)	-0.490265	-0.264285	0.073764	-0.044777	0.306924
	(0.18549)	(0.29802)	(0.04977)	(0.40317)	(1.43188)
	[-2.64308]	[-0.88681]	[1.48200]	[-0.11106]	[0.21435]
GR_Y(-2)	-0.251609	0.186374	-0.002197	-0.223785	1.147357
	(0.19209)	(0.30862)	(0.05154)	(0.41752)	(1.48284)
	[-1.30984]	[0.60389]	[-0.04261]	[-0.53599]	[0.77376]
GR_Y(-3)	0.048674	0.525007	-0.020145	-0.592175	-0.071986
	(0.14018)	(0.22523)	(0.03762)	(0.30470)	(1.08215)
	[0.34721]	[2.33101]	[-0.53555]	[-1.94348]	[-0.06652]
MONETARYIND(-1)	-0.153721	0.102146	0.024160	-0.000828	-0.066457
	(0.11463)	(0.18417)	(0.03076)	(0.24916)	(0.88489)
	[-1.34100]	[0.55462]	[0.78545]	[-0.00332]	[-0.07510]
MONETARYIND(-2)	-0.078832	0.061850	-0.052787	0.035949	2.042957
	(0.13057)	(0.20979)	(0.03504)	(0.28381)	(1.00796)
	[-0.60374]	[0.29483]	[-1.50658]	[0.12667]	[2.02683]
MONETARYIND(-3)	0.292157	0.121002	0.009873	0.299854	-1.270166
	(0.11743)	(0.18868)	(0.03151)	(0.25525)	(0.90653)
	[2.48783]	[0.64132]	[0.31332]	[1.17475]	[-1.40113]
FISCALIND(-1)	2.738810	1.511679	2.089331	3.920077	-0.354537
	(0.77958)	(1.25251)	(0.20919)	(1.69445)	(6.01792)
	[3.51319]	[1.20692]	[9.98780]	[2.31348]	[-0.05891]
FISCALIND(-2)	-4.770763	-4.702613	-1.700102	-4.018412	3.531195
	(1.37308)	(2.20604)	(0.36844)	(2.98444)	(10.5994)
	[-3.47451]	[-2.13170]	[-4.61427]	[-1.34646]	[0.33315]
FISCALIND(-3)	2.797556	3.617833	0.460301	2.120649	-3.323919
	(0.79994)	(1.28521)	(0.21465)	(1.73870)	(6.17507)
	[3.49722]	[2.81497]	[2.14442]	[1.21968]	[-0.53828]
WAGEIND(-1)	-0.038858	-0.098157	0.037589	0.079678	0.737529
	(0.09634)	(0.15478)	(0.02585)	(0.20940)	(0.74369)
	[-0.40334]	[-0.63416]	[1.45403]	[0.38051]	[0.99172]
WAGEIND(-2)	-0.117631	-0.022551	0.013046	0.092216	0.478801
	(0.09100)	(0.14621)	(0.02442)	(0.19779)	(0.70247)
	[-1.29264]	[-0.15425]	[0.53427]	[0.46622]	[0.68159]

WAGEIND(-3)	-0.018193	0.006725	-0.041760	0.143783	-0.027803
	(0.07963)	(0.12794)	(0.02137)	(0.17308)	(0.61470)
	[-0.22846]	[0.05257]	[-1.95438]	[0.83074]	[-0.04523]
REER_CYCLE(-1)	-0.010086	-0.040035	-0.003217	0.091710	0.485987
	(0.02565)	(0.04121)	(0.00688)	(0.05575)	(0.19801)
	[-0.39323]	[-0.97148]	[-0.46744]	[1.64497]	[2.45442]
REER_CYCLE(-2)	0.044726	-0.047497	-0.002904	0.093594	0.619550
	(0.02257)	(0.03627)	(0.00606)	(0.04907)	(0.17426)
	[1.98124]	[-1.30958]	[-0.47940]	[1.90749]	[3.55527]
REER_CYCLE(-3)	0.038136	0.005809	-0.003984	-0.024967	-0.338702
	(0.02492)	(0.04004)	(0.00669)	(0.05417)	(0.19239)
	[1.53018]	[0.14507]	[-0.59579]	[-0.46090]	[-1.76050]
C	0.878434	-0.037790	0.020277	-0.772750	-0.993041
	(0.30211)	(0.48539)	(0.08107)	(0.65665)	(2.33213)
	[2.90765]	[-0.07786]	[0.25013]	[-1.17680]	[-0.42581]
DUMMY78	-0.434681	2.021411	-0.185694	1.106269	-2.177061
	(0.92924)	(1.49296)	(0.24935)	(2.01974)	(7.17321)
	[-0.46778]	[1.35397]	[-0.74472]	[0.54773]	[-0.30350]
DUMMY78(-1)	1.569967	-2.787805	-0.000964	-0.103014	65.13611
	(0.96762)	(1.55461)	(0.25964)	(2.10315)	(7.46945)
	[1.62251]	[-1.79325]	[-0.00371]	[-0.04898]	[8.72033]
DUMMY78(-2)	0.327416	1.295095	-0.033950	-7.906209	-42.99066
	(1.78009)	(2.85997)	(0.47766)	(3.86909)	(13.7413)
	[0.18393]	[0.45284]	[-0.07108]	[-2.04343]	[-3.12858]
DUMMY78(-3)	-2.491069	0.933706	0.376935	-5.067439	20.57399
	(1.26522)	(2.03275)	(0.33950)	(2.75000)	(9.76678)
	[-1.96888]	[0.45933]	[1.11026]	[-1.84270]	[2.10653]
DUMMY80Q3	3.507461	-0.427759	-0.145129	1.559402	-3.173331
	(0.85507)	(1.37379)	(0.22944)	(1.85852)	(6.60063)
	[4.10198]	[-0.31137]	[-0.63252]	[0.83906]	[-0.48076]
DUMMY80Q3(-1)	-1.219573	-0.349670	-0.534014	4.186285	-3.781339
	(1.06450)	(1.71027)	(0.28564)	(2.31374)	(8.21736)
	[-1.14567]	[-0.20445]	[-1.86952]	[1.80932]	[-0.46016]
DUMMY80Q3(-2)	-1.140595	-2.535849	-0.109786	3.796324	-2.362495
	(1.25952)	(2.02360)	(0.33797)	(2.73762)	(9.72281)
	[-0.90558]	[-1.25314]	[-0.32484]	[1.38672]	[-0.24298]
DUMMY80Q3(-3)	0.066485	-4.786407	0.011558	4.279596	9.783003
	(1.23703)	(1.98747)	(0.33194)	(2.68874)	(9.54919)
	[0.05375]	[-2.40829]	[0.03482]	[1.59167]	[1.02448]

R-squared	0.832199	0.823646	0.988085	0.903636	0.909774
Adj. R-squared	0.648416	0.630497	0.975036	0.798095	0.810955
Sum sq. resids	9.388112	24.23355	0.675978	44.35208	559.4357
S.E. equation	0.668620	1.074234	0.179414	1.453274	5.161375
F-statistic	4.528173	4.264298	75.71831	8.561918	9.206462
Log likelihood	-28.58982	-49.92644	30.60856	-63.52592	-120.5582
Akaike AIC	2.337325	3.285619	-0.293714	3.890041	6.424810
Schwarz SC	3.300879	4.249173	0.669839	4.853594	7.388363
Mean dependent	0.726518	0.514681	-0.024040	-2.167758	-0.511974
S.D. dependent	1.127626	1.767217	1.135527	3.234251	11.87087

Determinant resid covariance (dof adj.)	0.538125
Determinant resid covariance	0.011910
Log likelihood	-219.5780
Akaike information criterion	15.09235
Schwarz criterion	19.91012

Figure A 6: AR Roots for VAR I for Macroeconomic Policy in Finland 1975q4 – 1986q4

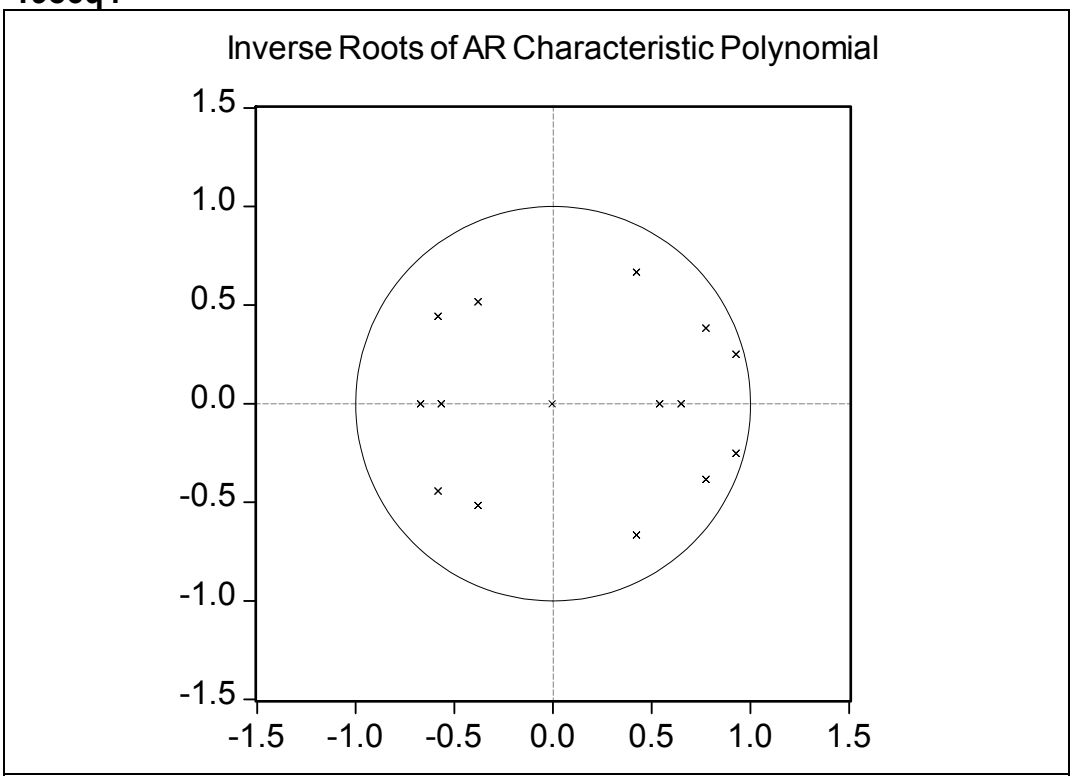


Table A 15: VAR Residual Serial Correlation LM Tests for VAR I for Macroeconomic Policy in Finland 1975q4 – 1986q4

H0: no serial correlation at lag order h
Included observations: 45

Lags	LM-Stat	Prob
1	25.25187	0.4483
2	44.42191	0.0097
3	23.92935	0.5235
4	31.37091	0.1770
5	17.95410	0.8443
6	21.48009	0.6656
7	12.32706	0.9837
8	33.41277	0.1211
9	18.40483	0.8247
10	18.41040	0.8245
11	20.89327	0.6985
12	31.13222	0.1847

Probs from chi-square with 25 df.

Table A 16: VAR Residual Normality Tests for VAR I for Macroeconomic Policy in Finland 1975q4 – 1986q4

Orthogonalization: Residual Covariance (Urzua)
H0: residuals are multivariate normal
Included observations: 45

Component	Skewness	Chi-sq	df	Prob.
1	0.009442	0.000763	1	0.9780
2	0.395038	1.335539	1	0.2478
3	0.227845	0.444280	1	0.5051
4	-0.011010	0.001037	1	0.9743
5	0.099637	0.084962	1	0.7707
Joint		1.866581	5	0.8673

Component	Kurtosis	Chi-sq	df	Prob.
1	0.572280	13.74090	1	0.0002
2	1.229791	7.000897	1	0.0081
3	0.892642	10.17572	1	0.0014
4	0.587399	13.56064	1	0.0002
5	0.618321	13.19565	1	0.0003
Joint		57.67380	5	0.0000

Component	Jarque-Bera	df	Prob.
1	13.74166	2	0.0010
2	8.336436	2	0.0155
3	10.62000	2	0.0049
4	13.56167	2	0.0011
5	13.28061	2	0.0013
Joint	121.1992	105	0.1334

Table A 17: VAR II for Macroeconomic Policy in Finland 1987q1 – 2005q1

Included observations: 73 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GR_Y	MONETARY-IND	FISCALIND	WAGEIND	REER_CYCLE
GR_Y(-1)	-0.304838	0.046723	-0.021947	-0.092493	-0.080673
	(0.12801)	(0.14984)	(0.04348)	(0.14906)	(0.44150)
	[-2.38133]	[0.31182]	[-0.50472]	[-0.62050]	[-0.18272]
GR_Y(-2)	0.165402	-0.010946	0.026408	0.113919	0.710188
	(0.10457)	(0.12240)	(0.03552)	(0.12176)	(0.36064)
	[1.58178]	[-0.08943]	[0.74348]	[0.93558]	[1.96923]
GR_Y(-3)	0.527948	-0.133042	-0.114960	0.150434	-0.696069
	(0.10345)	(0.12109)	(0.03514)	(0.12046)	(0.35678)
	[5.10355]	[-1.09871]	[-3.27152]	[1.24883]	[-1.95097]
GR_Y(-4)	0.300643	0.021708	-0.035760	0.033772	0.709458
	(0.13045)	(0.15270)	(0.04431)	(0.15190)	(0.44992)
	[2.30463]	[0.14216]	[-0.80698]	[0.22232]	[1.57686]
MONETARYIND(-1)	0.024920	0.784053	0.036858	-0.079736	0.067448
	(0.11524)	(0.13490)	(0.03915)	(0.13419)	(0.39746)
	[0.21624]	[5.81226]	[0.94155]	[-0.59418]	[0.16970]
MONETARYIND(-2)	-0.135845	-0.238136	0.089112	0.086186	-0.757258
	(0.10938)	(0.12803)	(0.03715)	(0.12737)	(0.37724)
	[-1.24197]	[-1.85998]	[2.39844]	[0.67668]	[-2.00738]
MONETARYIND(-3)	-0.032691	0.058328	-0.003465	0.259823	0.415121
	(0.10912)	(0.12773)	(0.03707)	(0.12706)	(0.37634)
	[-0.29960]	[0.45666]	[-0.09349]	[2.04483]	[1.10305]
MONETARYIND(-4)	-0.184665	-0.066747	0.037754	-0.016464	-1.141584
	(0.09879)	(0.11564)	(0.03356)	(0.11504)	(0.34073)
	[-1.86922]	[-0.57719]	[1.12501]	[-0.14312]	[-3.35042]
FISCALIND(-1)	0.546147	-0.149045	1.873887	-0.535059	1.636321

	(0.39120)	(0.45792)	(0.13289)	(0.45554)	(1.34922)
	[1.39608]	[-0.32548]	[14.1015]	[-1.17457]	[1.21279]
FISCALIND(-2)	-1.204030	0.345253	-1.217702	0.550587	-3.013405
	(0.87978)	(1.02982)	(0.29885)	(1.02447)	(3.03431)
	[-1.36855]	[0.33525]	[-4.07463]	[0.53744]	[-0.99311]
FISCALIND(-3)	1.406251	-0.246719	0.037926	-0.065168	2.066766
	(0.86430)	(1.01170)	(0.29359)	(1.00644)	(2.98092)
	[1.62703]	[-0.24386]	[0.12918]	[-0.06475]	[0.69333]
FISCALIND(-4)	-0.444996	-0.047610	0.239128	0.109853	-1.091876
	(0.37741)	(0.44177)	(0.12820)	(0.43947)	(1.30165)
	[-1.17908]	[-0.10777]	[1.86527]	[0.24996]	[-0.83884]
WAGEIND(-1)	-0.081675	0.137033	0.047170	0.618089	0.331494
	(0.11737)	(0.13738)	(0.03987)	(0.13667)	(0.40480)
	[-0.69589]	[0.99744]	[1.18314]	[4.52248]	[0.81892]
WAGEIND(-2)	0.163299	-0.426940	-0.048814	0.225574	-0.449131
	(0.13597)	(0.15915)	(0.04619)	(0.15833)	(0.46894)
	[1.20103]	[-2.68257]	[-1.05690]	[1.42474]	[-0.95776]
WAGEIND(-3)	0.072369	0.130528	0.040561	0.186554	0.940135
	(0.14200)	(0.16622)	(0.04824)	(0.16536)	(0.48976)
	[0.50963]	[0.78527]	[0.84086]	[1.12819]	[1.91958]
WAGEIND(-4)	-0.078326	0.058200	-0.029590	-0.143790	-1.110957
	(0.11170)	(0.13076)	(0.03794)	(0.13008)	(0.38526)
	[-0.70118]	[0.44511]	[-0.77983]	[-1.10544]	[-2.88364]
REER_CYCLE(-1)	-0.087937	0.013123	0.025164	0.069485	1.033579
	(0.03510)	(0.04108)	(0.01192)	(0.04087)	(0.12105)
	[-2.50542]	[0.31942]	[2.11065]	[1.70012]	[8.53830]
REER_CYCLE(-2)	0.002144	-0.031426	-0.012781	-0.017300	-0.502856
	(0.05116)	(0.05989)	(0.01738)	(0.05957)	(0.17645)
	[0.04190]	[-0.52476]	[-0.73545]	[-0.29039]	[-2.84987]
REER_CYCLE(-3)	-0.004565	0.036161	-0.000537	0.018362	0.301180
	(0.04620)	(0.05408)	(0.01569)	(0.05380)	(0.15933)
	[-0.09881]	[0.66871]	[-0.03424]	[0.34134]	[1.89025]
REER_CYCLE(-4)	0.050992	0.022606	-0.008413	-0.066125	-0.062177
	(0.03365)	(0.03939)	(0.01143)	(0.03918)	(0.11605)
	[1.51544]	[0.57394]	[-0.73605]	[-1.68764]	[-0.53578]
C	0.205052	-0.088597	0.101080	-0.155028	-0.607417
	(0.16935)	(0.19824)	(0.05753)	(0.19721)	(0.58409)
	[1.21078]	[-0.44693]	[1.75708]	[-0.78613]	[-1.03994]

R-squared	0.722647	0.760425	0.989398	0.898634	0.931625
Adj. R-squared	0.615973	0.668280	0.985320	0.859647	0.905327
Sum sq. resids	24.93967	34.17147	2.877699	33.81700	296.6594
S.E. equation	0.692538	0.810644	0.235245	0.806428	2.388512
F-statistic	6.774330	8.252530	242.6280	23.04954	35.42581
Log likelihood	-64.38152	-75.87652	14.43909	-75.49591	-154.7601
Akaike AIC	2.339220	2.654151	0.179751	2.643724	4.815345
Schwarz SC	2.998119	3.313050	0.838650	3.302623	5.474244
Mean dependent	0.594257	-0.181455	0.040909	-0.567493	0.276383
S.D. dependent	1.117539	1.407487	1.941577	2.152556	7.762747

Determinant resid covariance (dof adj.)	0.055421
Determinant resid covariance	0.010164
Log likelihood	-350.4189
Akaike information criterion	12.47723
Schwarz criterion	15.77173

Figure A 7: AR Roots for VAR II for Macroeconomic Policy in Finland 1987q1 – 2005q1

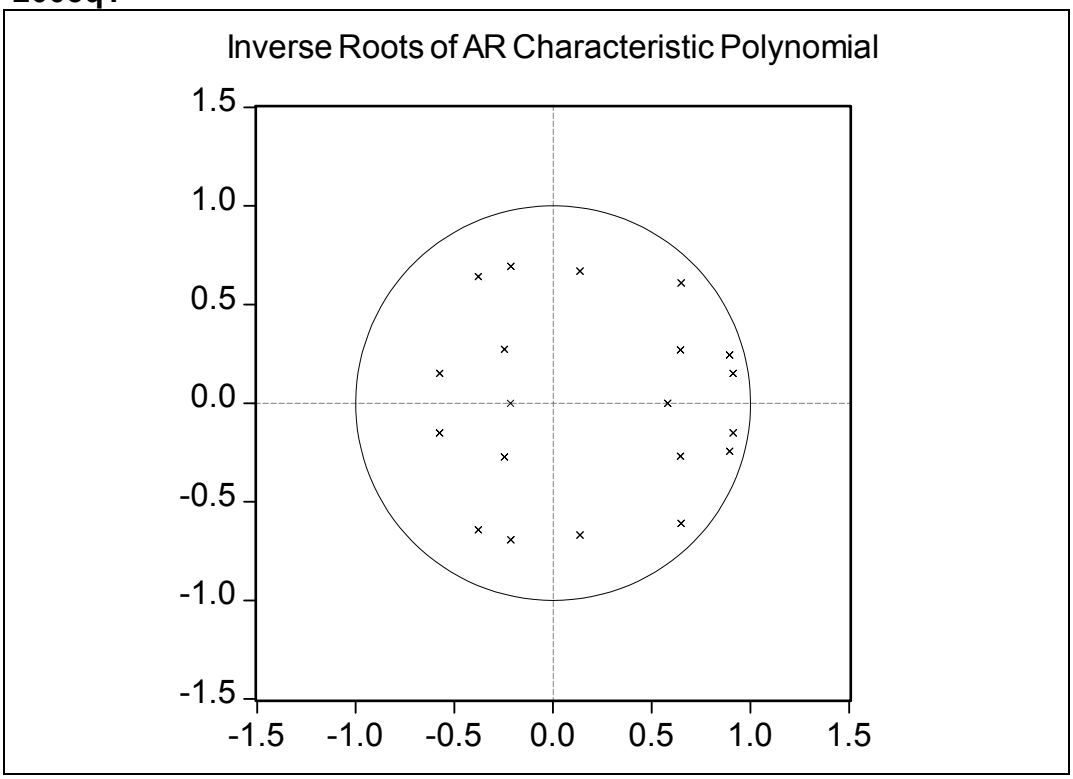


Table A 18: VAR Residual Serial Correlation LM Tests for VAR II for Macroeconomic Policy in Finland 1987q1 – 2005q1

H0: no serial correlation at lag order h
Included observations: 73

Lags	LM-Stat	Prob
1	28.14103	0.3014
2	32.79009	0.1364
3	47.33410	0.0045
4	41.33828	0.0211
5	29.08080	0.2606
6	19.31297	0.7819
7	29.99784	0.2244
8	31.66337	0.1680
9	29.61537	0.2390
10	28.02711	0.3066
11	26.77243	0.3673
12	38.97878	0.0370

Probs from chi-square with 25 df.

Table A 19: VAR Residual Normality Tests for VAR II for Macroeconomic Policy in Finland 1987q1 – 2005q1

Orthogonalization: Residual Covariance (Urzua)
H0: residuals are multivariate normal
Included observations: 73

Component	Skewness	Chi-sq	df	Prob.
1	-0.363914	1.748367	1	0.1861
2	0.027226	0.009786	1	0.9212
3	-0.292994	1.133321	1	0.2871
4	-0.214237	0.605934	1	0.4363
5	0.023052	0.007016	1	0.9332
Joint		3.504423	5	0.6227

Component	Kurtosis	Chi-sq	df	Prob.
1	1.768302	4.935632	1	0.0263
2	2.090483	2.558580	1	0.1097
3	2.330064	1.292700	1	0.2556
4	1.950138	3.498904	1	0.0614
5	1.850795	4.253281	1	0.0392
Joint		16.53910	5	0.0055

Component	Jarque-Bera	df	Prob.
1	6.683999	2	0.0354
2	2.568366	2	0.2769
3	2.426021	2	0.2973
4	4.104838	2	0.1284
5	4.260297	2	0.1188
Joint	101.1087	105	0.5893

Table A 20: VAR I for Macroeconomic Policy in Denmark 1982q1 – 2006q4

Included observations: 100
Standard errors in ( ) & t-statistics in [ ]

	GR_Y	MONETARY-IND	FISCALIND	WAGEIND	REER_CYCLE
GR_Y(-1)	-0.284764	0.087036	-0.177774	0.065320	-0.319195
	(0.10476)	(0.12400)	(0.15181)	(0.11589)	(0.27994)
	[-2.71837]	[0.70187]	[-1.17101]	[0.56365]	[-1.14023]
GR_Y(-3)	0.037473	-0.018299	-0.041841	-0.064203	0.497580
	(0.10539)	(0.12475)	(0.15272)	(0.11658)	(0.28162)
	[0.35558]	[-0.14669]	[-0.27396]	[-0.55070]	[1.76683]
GR_Y(-4)	0.043395	-0.110915	-0.080300	0.127117	0.103285
	(0.10133)	(0.11995)	(0.14685)	(0.11210)	(0.27079)
	[0.42825]	[-0.92466]	[-0.54682]	[1.13396]	[0.38142]
MONETARYIND(-1)	-0.047021	0.660767	0.090291	0.024605	0.130992
	(0.07038)	(0.08331)	(0.10199)	(0.07785)	(0.18806)
	[-0.66814]	[7.93172]	[0.88530]	[0.31604]	[0.69653]
MONETARYIND(-3)	-0.074828	0.236107	0.106907	-0.009951	0.091385
	(0.06488)	(0.07680)	(0.09402)	(0.07177)	(0.17337)
	[-1.15340]	[3.07441]	[1.13708]	[-0.13865]	[0.52711]
MONETARYIND(-4)	0.038630	-0.371516	-0.088046	-0.065786	-0.225794
	(0.06341)	(0.07507)	(0.09190)	(0.07015)	(0.16946)
	[0.60918]	[-4.94923]	[-0.95808]	[-0.93776]	[-1.33243]
FISCALIND(-1)	-0.093886	-0.134100	0.558528	0.044374	0.221486
	(0.07980)	(0.09447)	(0.11565)	(0.08828)	(0.21326)
	[-1.17646]	[-1.41954]	[4.82942]	[0.50263]	[1.03858]
FISCALIND(-3)	0.036909	-0.075980	-0.097540	-0.215303	-0.461189
	(0.08696)	(0.10293)	(0.12602)	(0.09620)	(0.23237)
	[0.42445]	[-0.73814]	[-0.77402]	[-2.23814]	[-1.98469]

FISCALIND(-4)	0.169680	-0.085392	0.154287	0.031717	0.523576
	(0.08488)	(0.10048)	(0.12301)	(0.09390)	(0.22682)
	[1.99909]	[-0.84988]	[1.25430]	[0.33778]	[2.30831]
WAGEIND(-1)	0.080638	-0.115802	0.051483	0.909351	0.208334
	(0.07725)	(0.09145)	(0.11195)	(0.08546)	(0.20644)
	[1.04383]	[-1.26632]	[0.45986]	[10.6404]	[1.00916]
WAGEIND(-3)	-0.231806	0.101451	-0.468547	0.148910	-0.004706
	(0.11943)	(0.14137)	(0.17307)	(0.13212)	(0.31914)
	[-1.94101]	[0.71762]	[-2.70723]	[1.12710]	[-0.01475]
WAGEIND(-4)	0.022795	-0.109426	0.280783	-0.177413	0.226922
	(0.10212)	(0.12088)	(0.14799)	(0.11297)	(0.27289)
	[0.22322]	[-0.90524]	[1.89734]	[-1.57046]	[0.83156]
REER_CYCLE(-1)	-0.028202	-0.072269	-0.012729	0.050656	0.604466
	(0.03529)	(0.04178)	(0.05114)	(0.03904)	(0.09431)
	[-0.79912]	[-1.72992]	[-0.24888]	[1.29750]	[6.40944]
REER_CYCLE(-3)	-0.005424	-0.006464	0.089294	-0.052893	0.103298
	(0.04279)	(0.05065)	(0.06201)	(0.04733)	(0.11434)
	[-0.12677]	[-0.12763]	[1.44012]	[-1.11748]	[0.90346]
REER_CYCLE(-4)	0.038560	0.013817	-0.020666	-0.021446	-0.296238
	(0.04141)	(0.04902)	(0.06001)	(0.04581)	(0.11066)
	[0.93117]	[0.28188]	[-0.34437]	[-0.46813]	[-2.67701]
C	0.574254	-0.037863	0.145659	-0.140532	0.003099
	(0.11835)	(0.14010)	(0.17151)	(0.13093)	(0.31627)
	[4.85216]	[-0.27026]	[0.84925]	[-1.07336]	[0.00980]
DUMMY93Q1	-1.707737	5.562529	-1.324562	-0.117433	1.944682
	(0.74269)	(0.87916)	(1.07631)	(0.82161)	(1.98469)
	[-2.29940]	[6.32711]	[-1.23065]	[-0.14293]	[0.97984]
DUMMY93Q1(-1)	-0.397301	-4.232095	-0.624839	-0.988462	-3.651620
	(0.92871)	(1.09936)	(1.34589)	(1.02741)	(2.48180)
	[-0.42780]	[-3.84960]	[-0.46426]	[-0.96210]	[-1.47136]
DUMMY93Q1(-3)	1.691412	-2.966633	-0.974126	1.087628	-0.444943
	(0.90942)	(1.07652)	(1.31793)	(1.00606)	(2.43025)
	[1.85988]	[-2.75575]	[-0.73913]	[1.08107]	[-0.18309]
DUMMY93Q1(-4)	1.622307	0.500066	0.441259	1.414026	3.077815
	(0.88264)	(1.04483)	(1.27913)	(0.97644)	(2.35869)
	[1.83801]	[0.47861]	[0.34497]	[1.44814]	[1.30488]
R-squared	0.384587	0.772598	0.442642	0.870673	0.592352
Adj. R-squared	0.238426	0.718590	0.310270	0.839958	0.495535
Sum sq. resids	35.91305	50.32378	75.42452	43.95178	256.4641

S.E. equation	0.670010	0.793125	0.970982	0.741213	1.790475
F-statistic	2.631259	14.30523	3.343917	28.34666	6.118297
Log likelihood	-90.69038	-107.5592	-127.7920	-100.7900	-188.9848
Akaike AIC	2.213808	2.551185	2.955839	2.415800	4.179696
Schwarz SC	2.734842	3.072219	3.476873	2.936834	4.700730
Mean dependent	0.573032	-0.030415	0.056723	-0.594852	-0.170805
S.D. dependent	0.767759	1.495105	1.169154	1.852789	2.520885

Determinant resid covariance (dof adj.)	0.378776
Determinant resid covariance	0.124117
Log likelihood	-605.1428
Akaike information criterion	14.10286
Schwarz criterion	16.70803

Figure A 8: AR Roots for VAR I for Macroeconomic Policy in Denmark 1982q1 – 2006q4

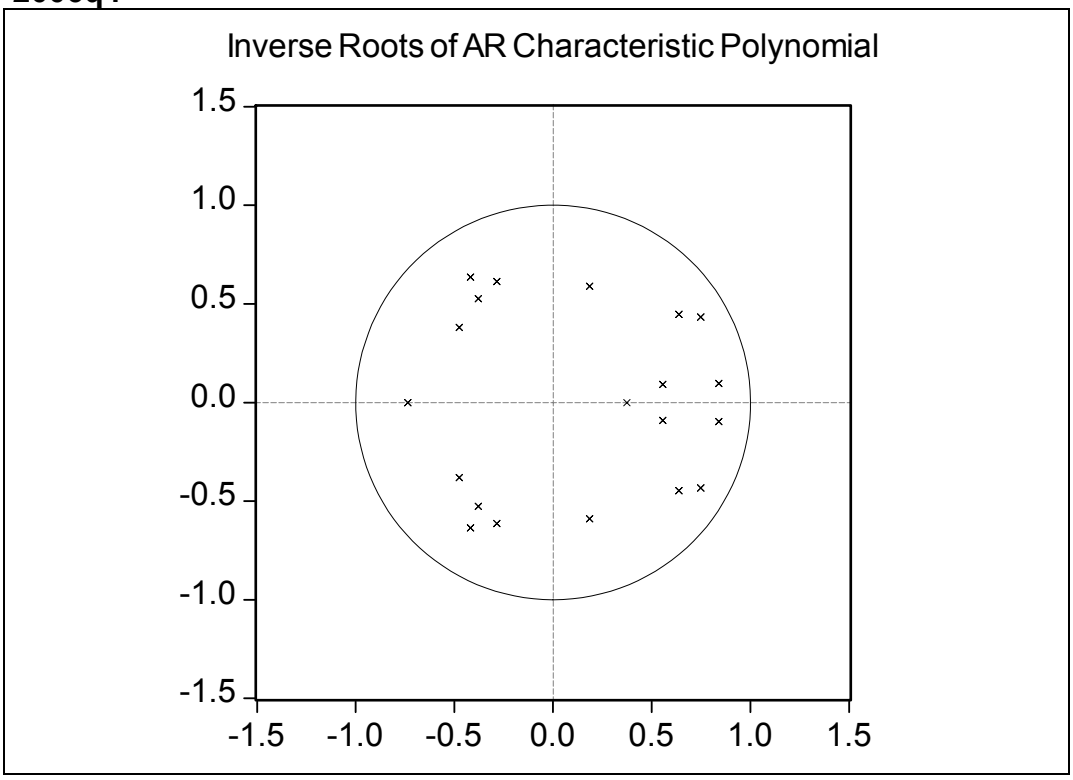


Table A 21: VAR Residual Serial Correlation LM Tests for VAR I for Macroeconomic Policy in Denmark 1982q1 – 2006q4

H0: no serial correlation at lag order h
Included observations: 100

Lags	LM-Stat	Prob
1	43.49514	0.0123
2	22.85202	0.5862
3	39.40221	0.0336
4	38.01082	0.0461
5	32.42118	0.1462
6	23.60535	0.5423
7	29.26206	0.2531
8	24.38466	0.4972
9	35.96632	0.0721
10	44.10143	0.0106
11	30.41524	0.2091
12	33.75711	0.1132

Probs from chi-square with 25 df.

Table A 22: VAR Residual Normality Tests for VAR I for Macroeconomic Policy in Denmark 1982q1 – 2006q4

Orthogonalization: Cholesky (Lutkepohl)
H0: residuals are multivariate normal
Included observations: 100

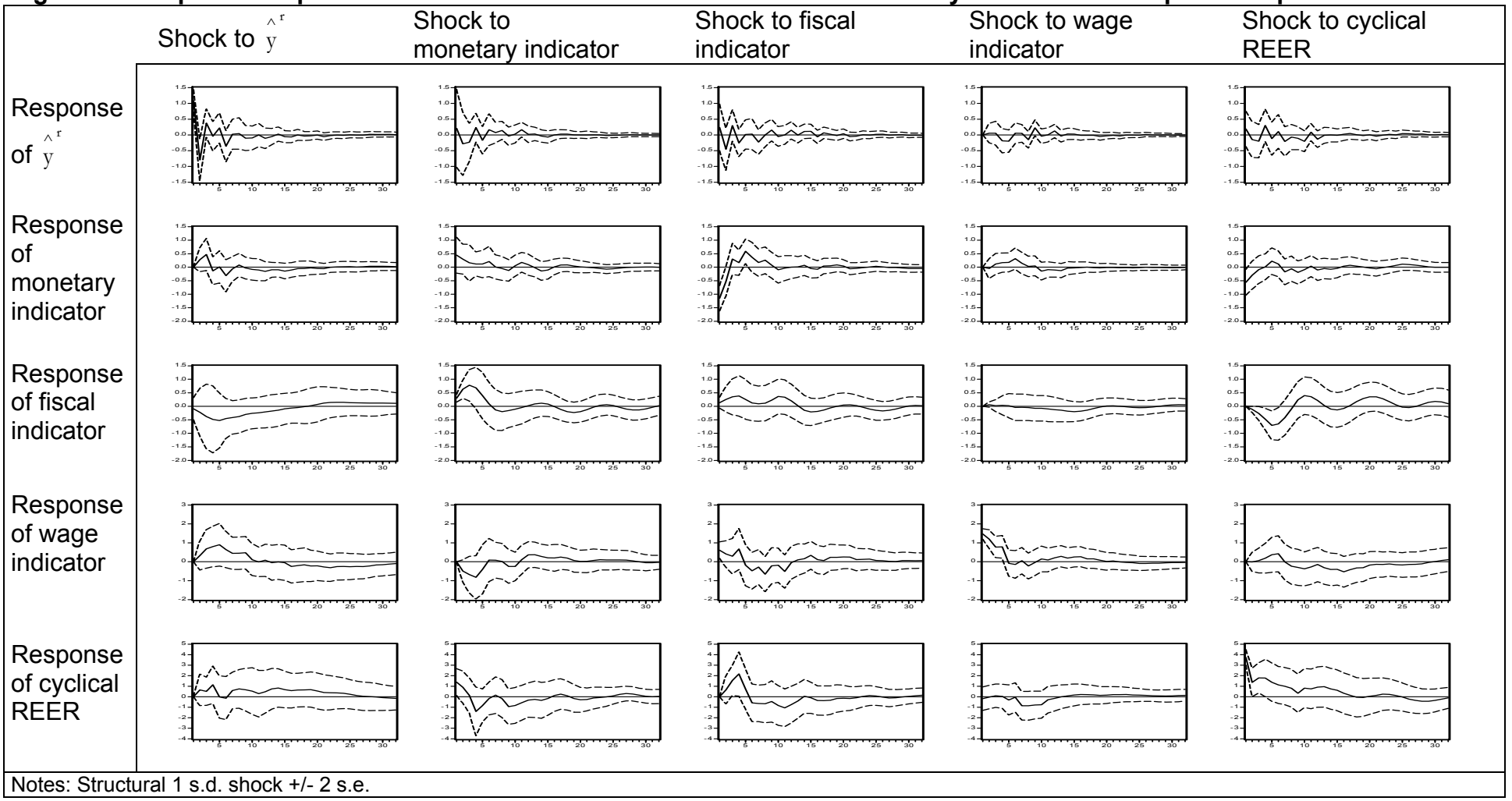
Component	Skewness	Chi-sq	df	Prob.
1	0.395893	2.612191	1	0.1060
2	0.012085	0.002434	1	0.9607
3	-0.230636	0.886552	1	0.3464
4	0.053257	0.047271	1	0.8279
5	0.181539	0.549272	1	0.4586
Joint		4.097720	5	0.5354

Component	Kurtosis	Chi-sq	df	Prob.
1	2.677535	0.433265	1	0.5104
2	3.178447	0.132681	1	0.7157
3	1.969400	4.425571	1	0.0354
4	2.633391	0.560008	1	0.4543
5	3.653955	1.781905	1	0.1819
Joint		7.333430	5	0.1970

Component	Jarque-Bera	df	Prob.

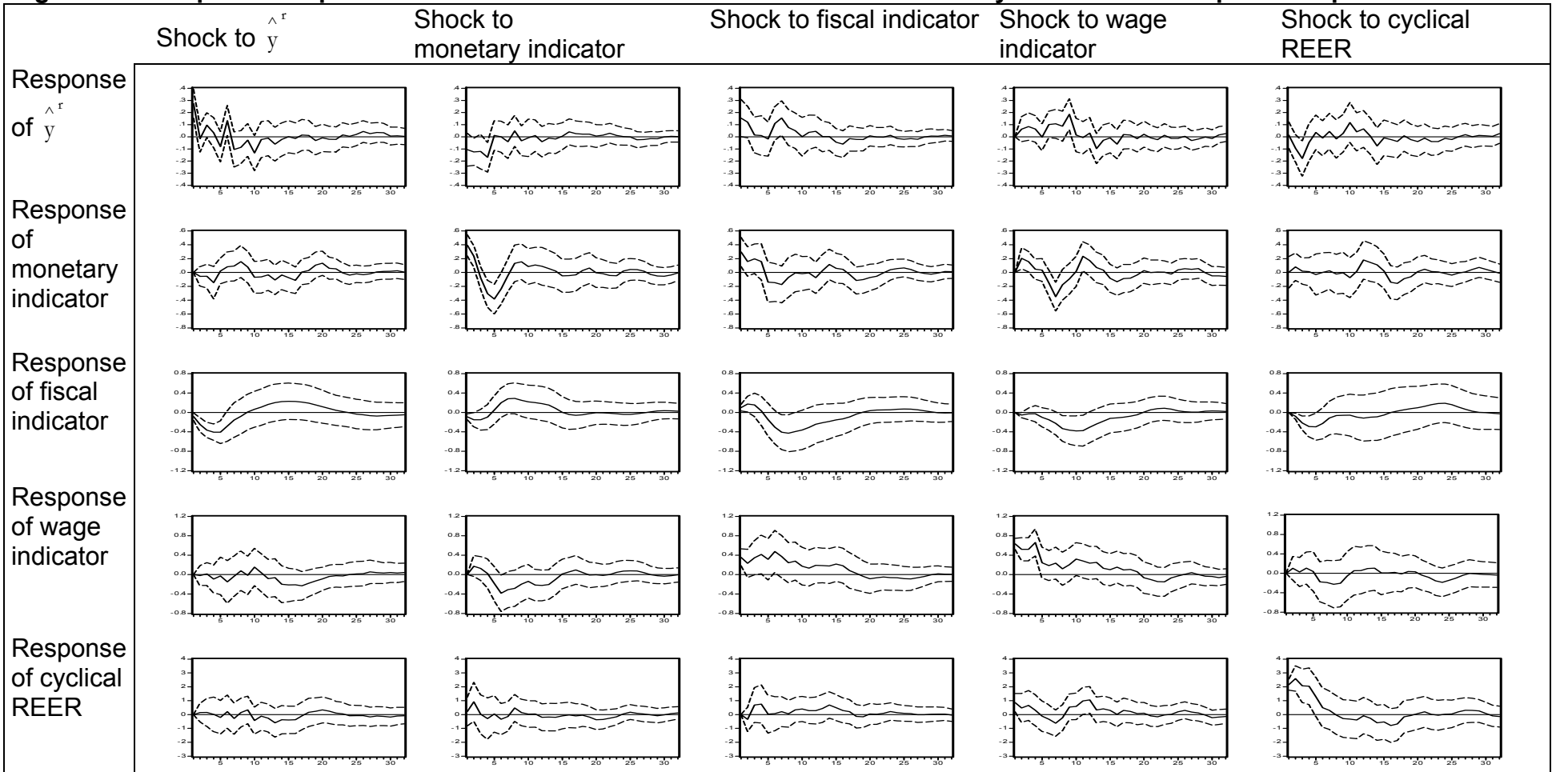
1	3.045456	2	0.2181
2	0.135115	2	0.9347
3	5.312123	2	0.0702
4	0.607279	2	0.7381
5	2.331178	2	0.3117
Joint	11.43115	10	0.3249

Figure A 9: Impulse-Response Functions of the VAR I for Macroeconomic Policy in Sweden 1976q2 – 1990q4



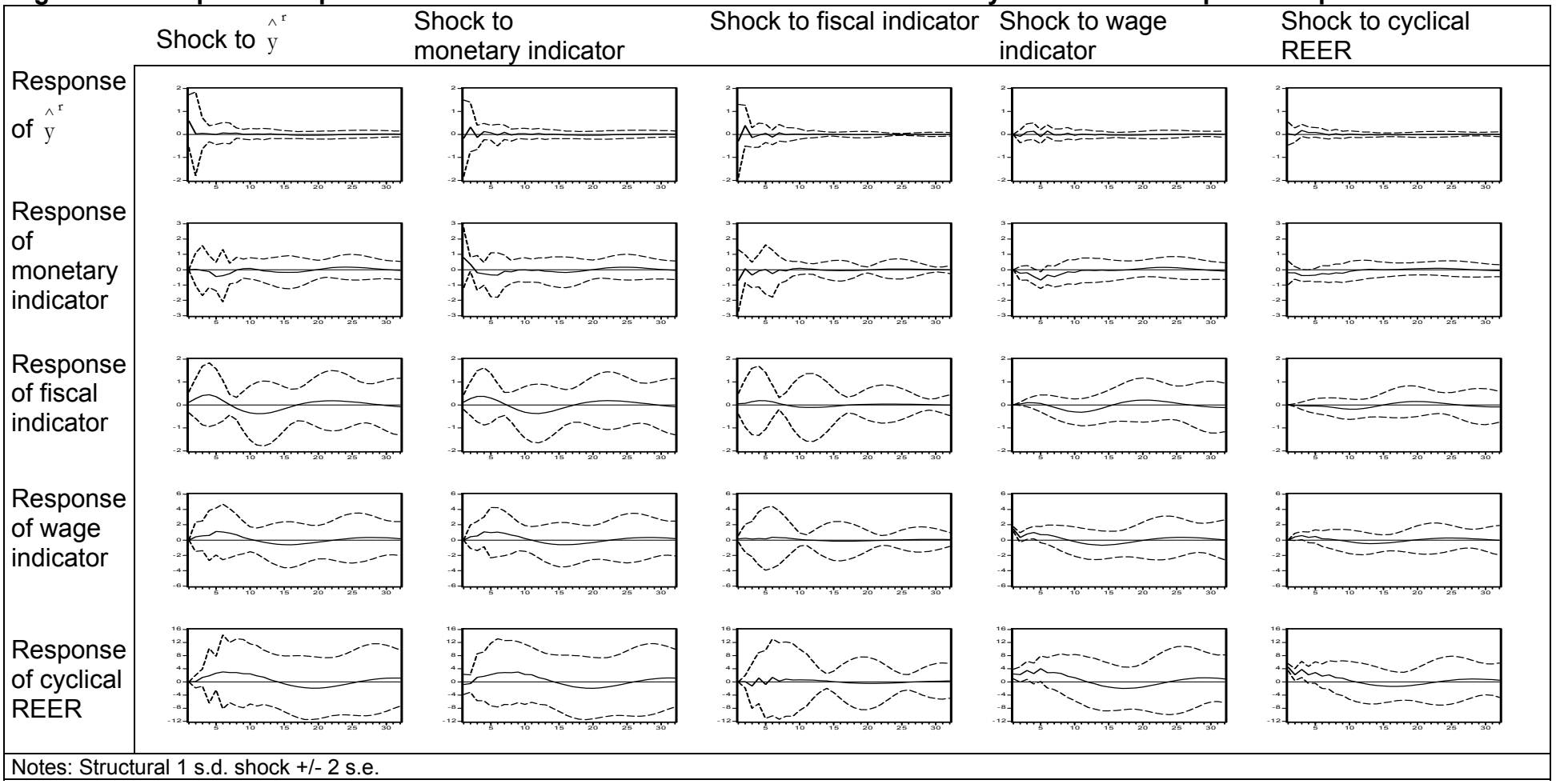
Notes: Structural 1 s.d. shock +/- 2 s.e.

Figure A 10: Impulse-Response Functions of the VAR II for Macroeconomic Policy in Sweden 1991q1 – 2006q2



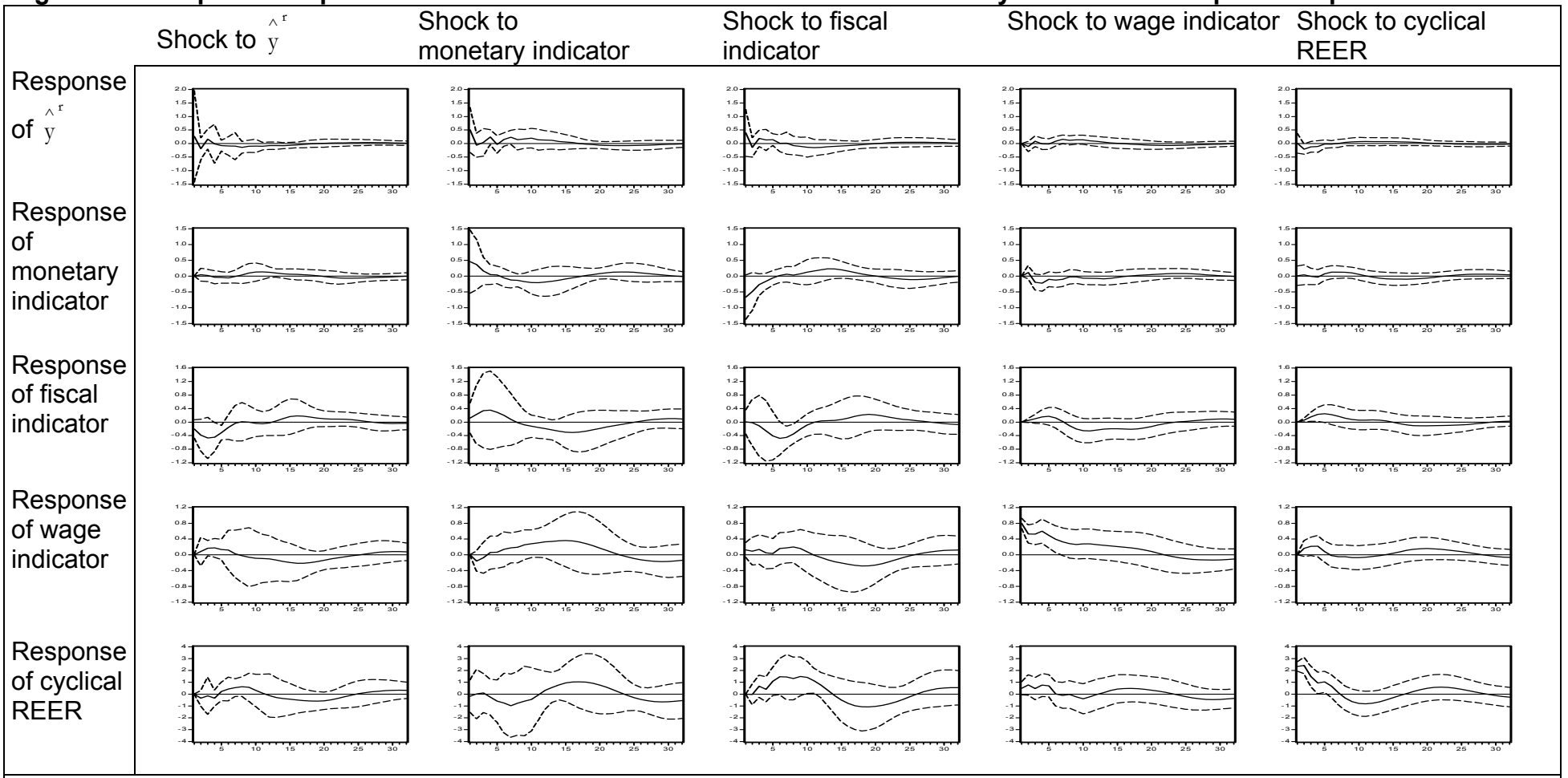
Notes: Structural 1 s.d. shock +/- 2 s.e.

Figure A 11: Impulse-Response Functions of the VAR I for Macroeconomic Policy in Finland 1975q4 – 1986q4



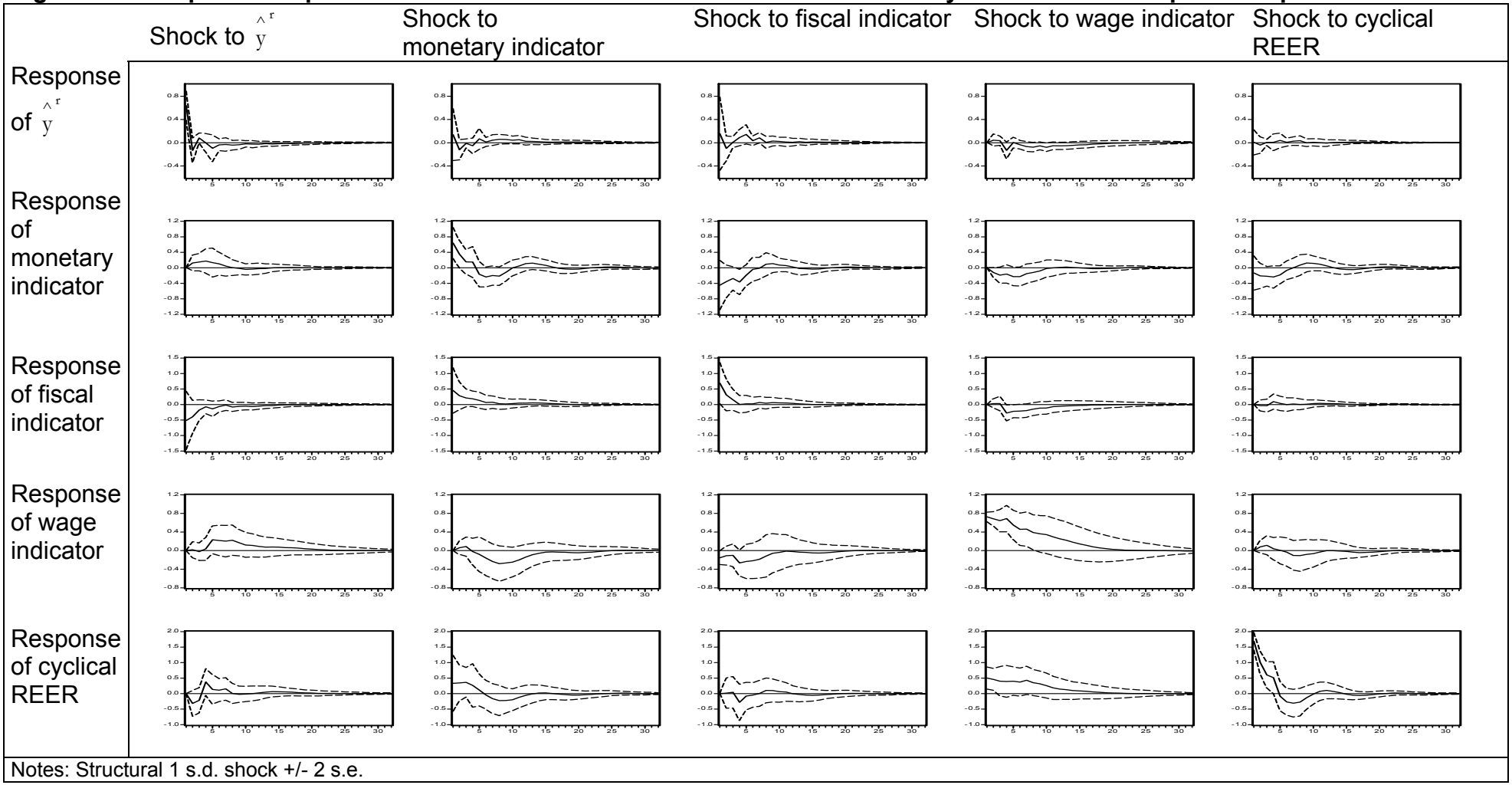
Notes: Structural 1 s.d. shock +/- 2 s.e.

Figure A 12: Impulse-Response Functions of the VAR II for Macroeconomic Policy in Finland 1987q1 – 2005q1



Notes: Structural 1 s.d. shock +/- 2 s.e.

Figure A 13: Impulse-Response Functions of the VAR I for Macroeconomic Policy in Denmark 1982q1 – 2006q4



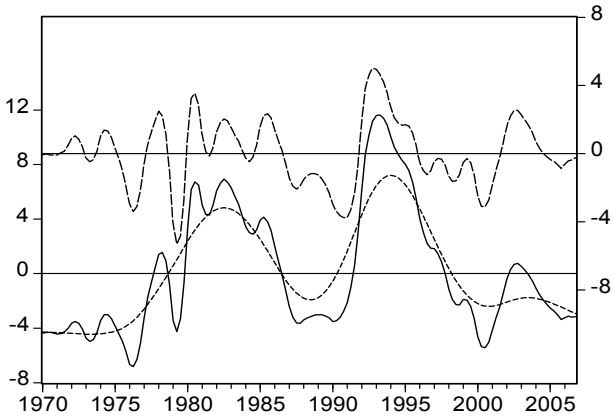
Notes: Structural 1 s.d. shock +/- 2 s.e.

Appendix B

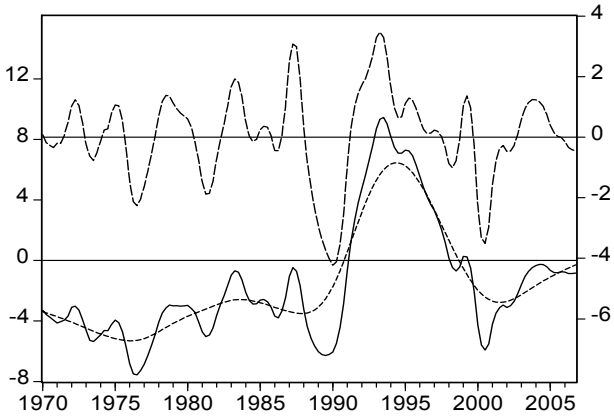
3 Figures and Tables for Part 3

Figure 3-1: Fiscal Indicators for Nordic EU-countries

Sweden



Finland



Denmark

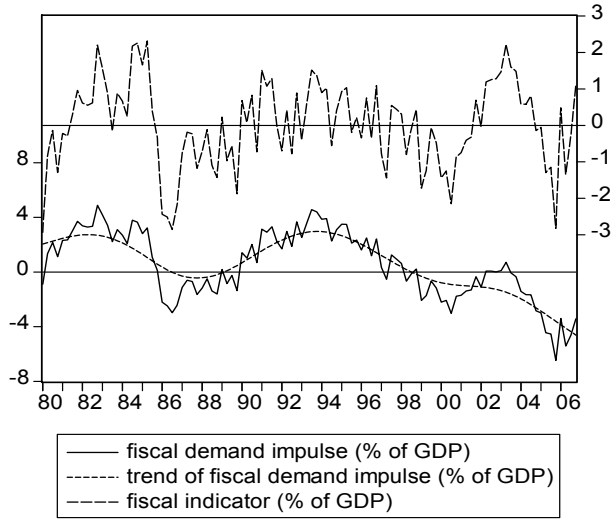
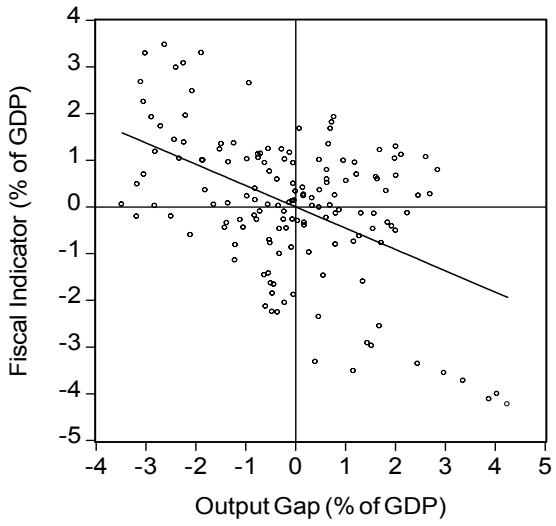
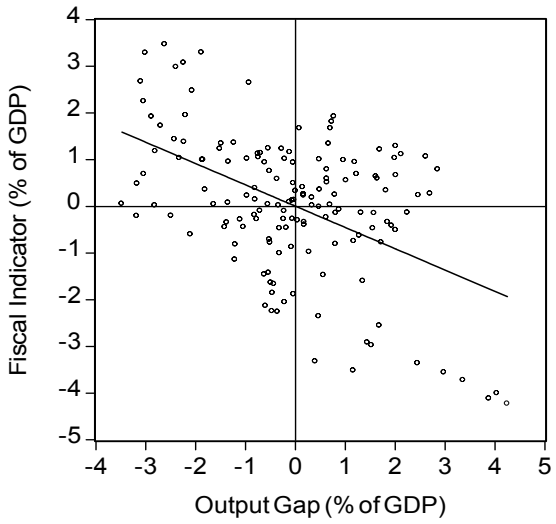


Figure 3-2: Correlation between Fiscal Indicators and Output Gaps in EU-Scandinavia

Sweden



Finland



Denmark

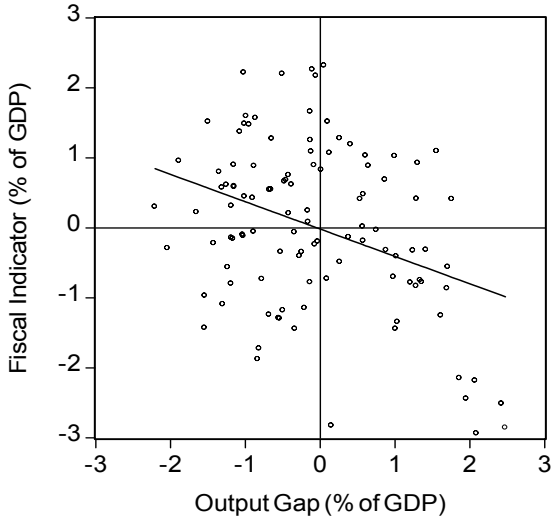
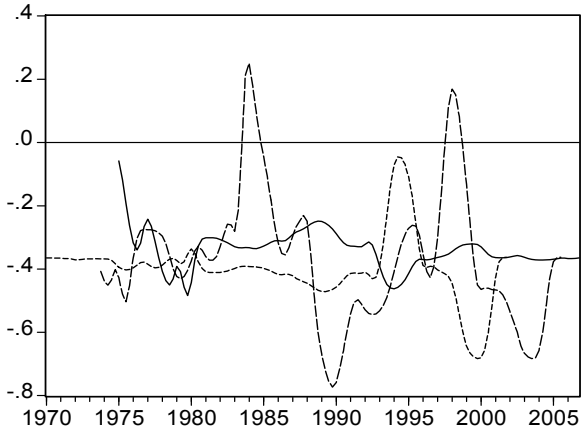
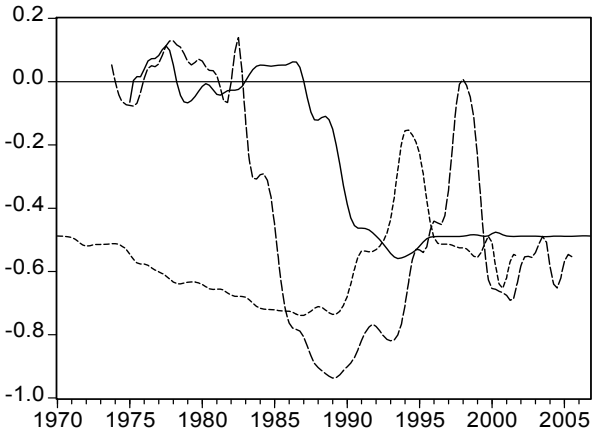


Figure 3-3: Structural Breaks of the Fiscal Indicators in EU-Scandinavia

Sweden



Finland



Denmark

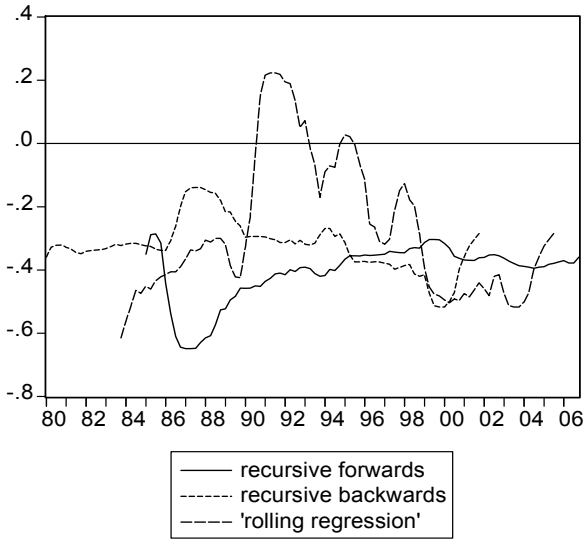
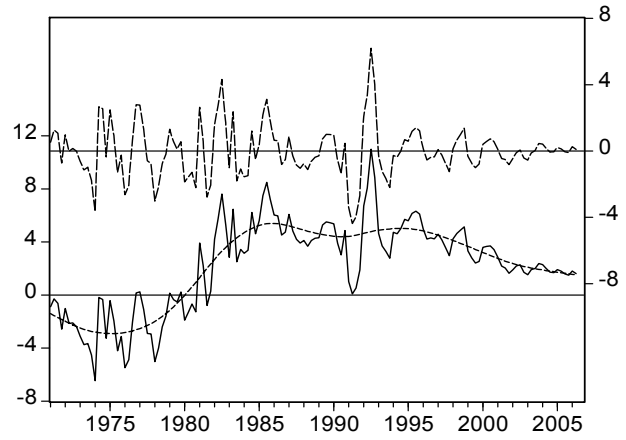
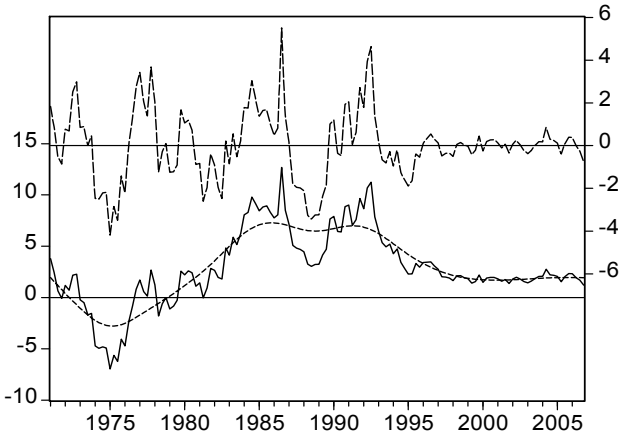


Figure 3-4: Monetary Indicators for the Nordic EU-Countries

Sweden



Finland



Denmark

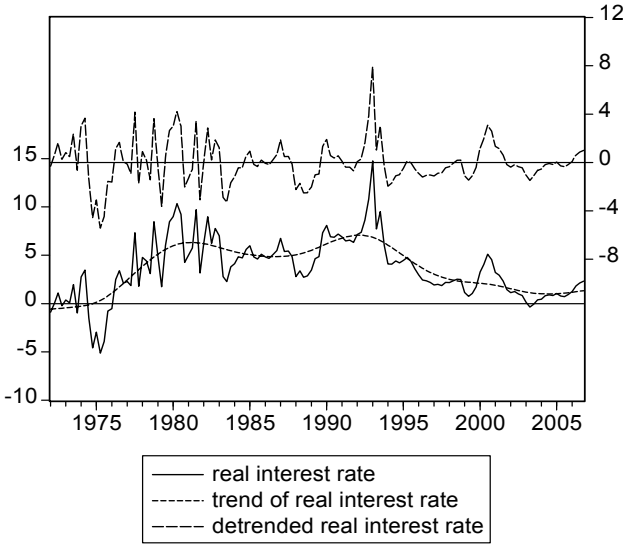
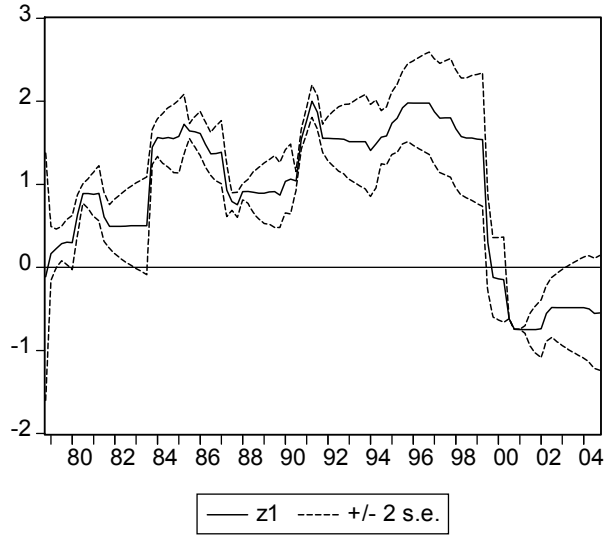
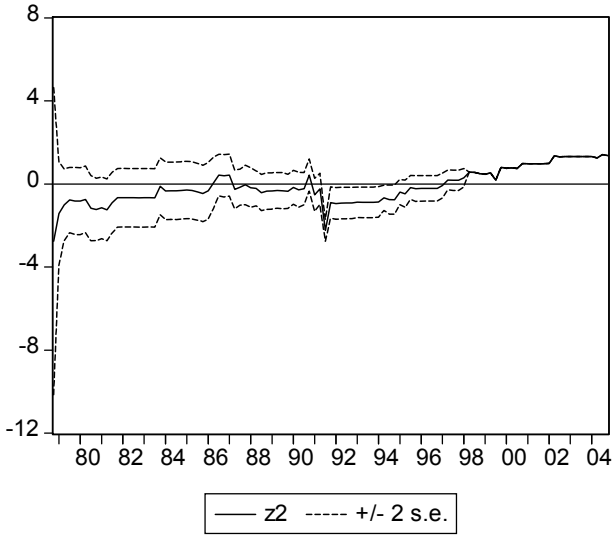


Figure 3-5: Time-varying coefficients of expected inflation, output gap and the nominal effective exchange rate in a Taylor-rule for Sweden

Time-variant coefficient of expected inflation:



Time-variant coefficient of the output gap:



Time-variant coefficient of the nominal effective exchange rate:

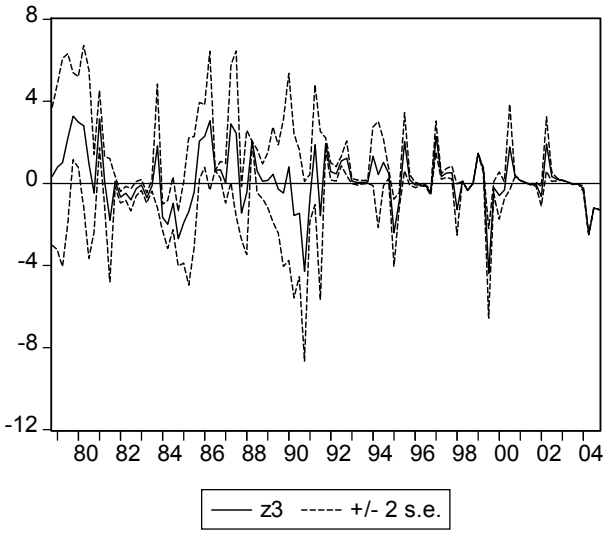
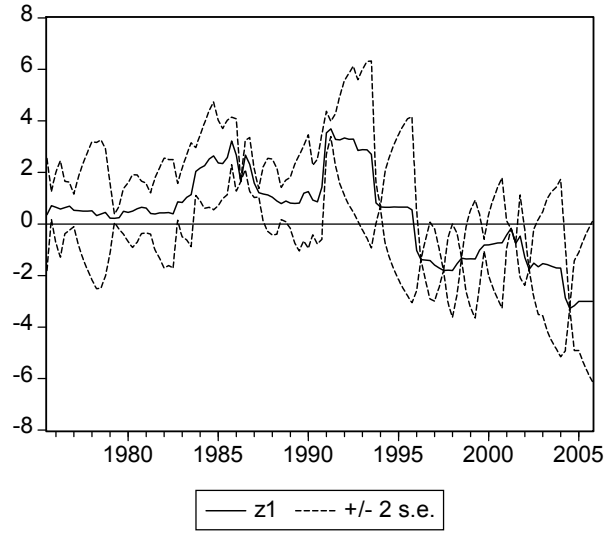
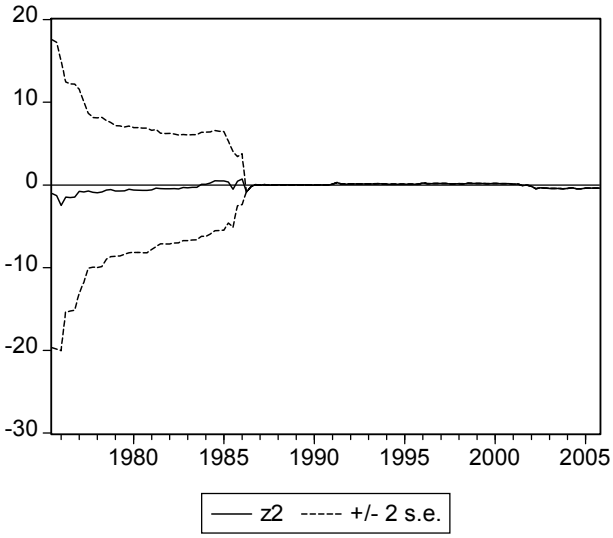


Figure 3-6: Time-varying coefficients of expected inflation, output gap and the nominal effective exchange rate in a Taylor-rule for Finland

Time-variant coefficient of expected inflation:



Time-variant coefficient of the output gap:



Time-variant coefficient of the nominal effective exchange rate:

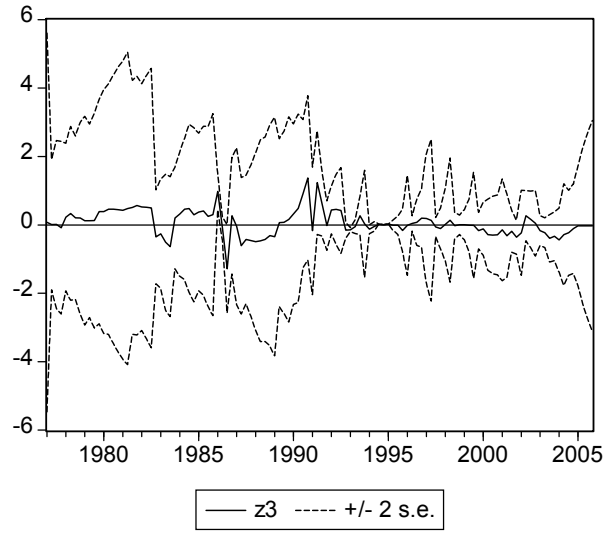
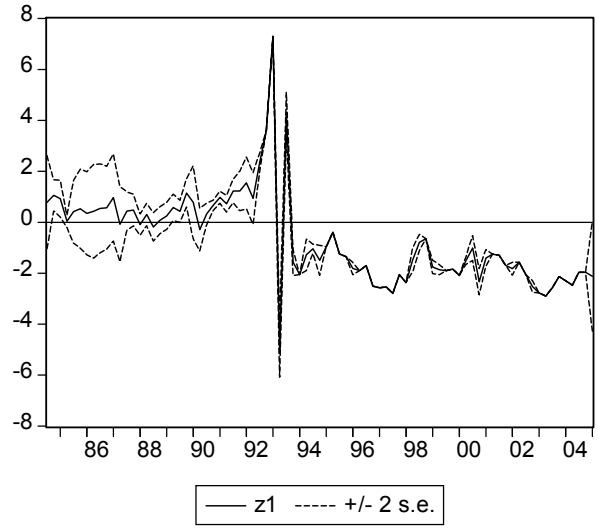
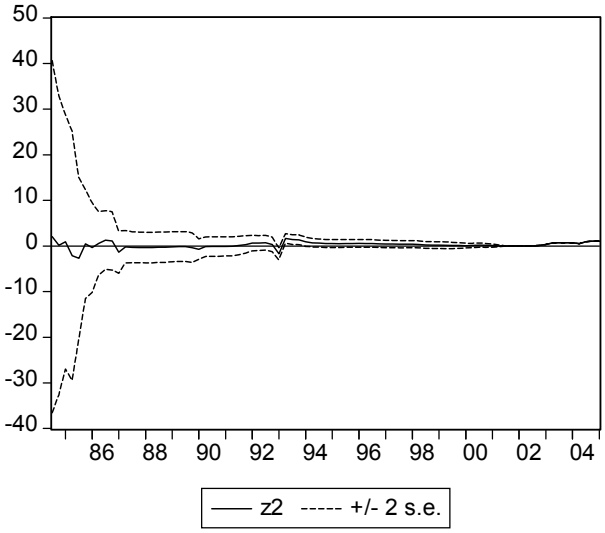


Figure 3-7: Time-varying coefficients of expected inflation, output gap and the nominal effective exchange rate in a Taylor-rule for Denmark

Time-variant coefficient of expected inflation:



Time-variant coefficient of the output gap:



Time-variant coefficient of the nominal effective exchange rate:

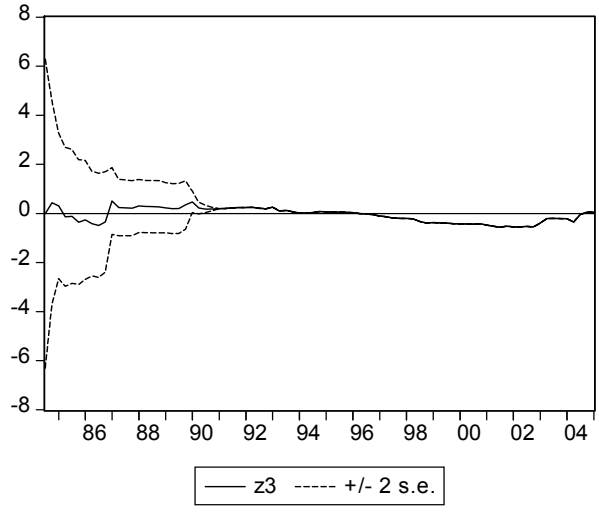
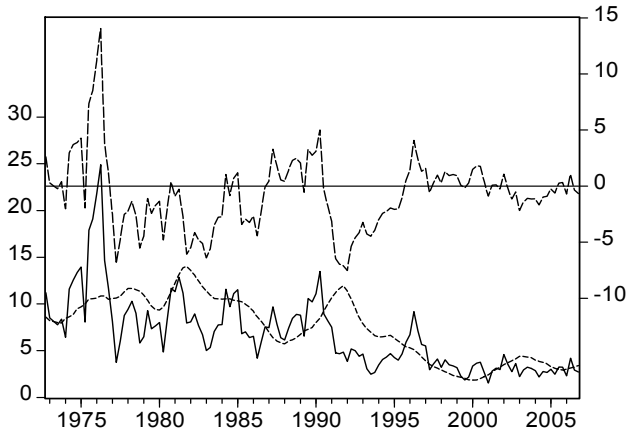
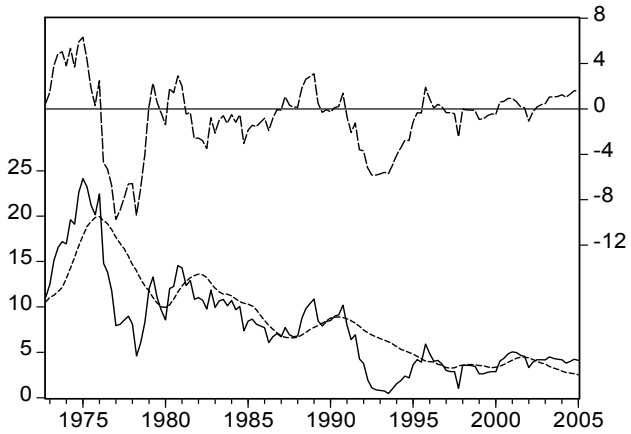


Figure 3-8: Wage Indicators for the Nordic EU-Countries

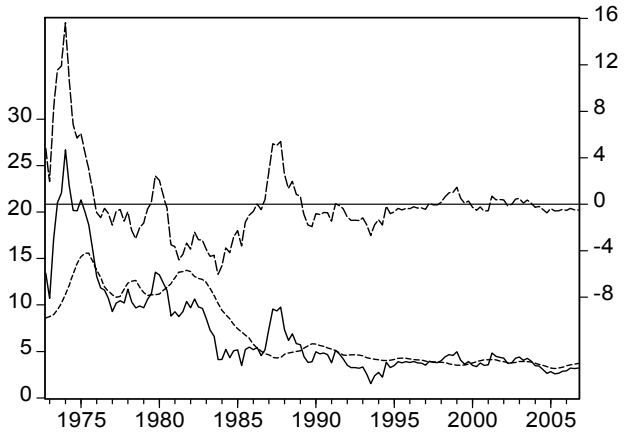
Sweden



Finland



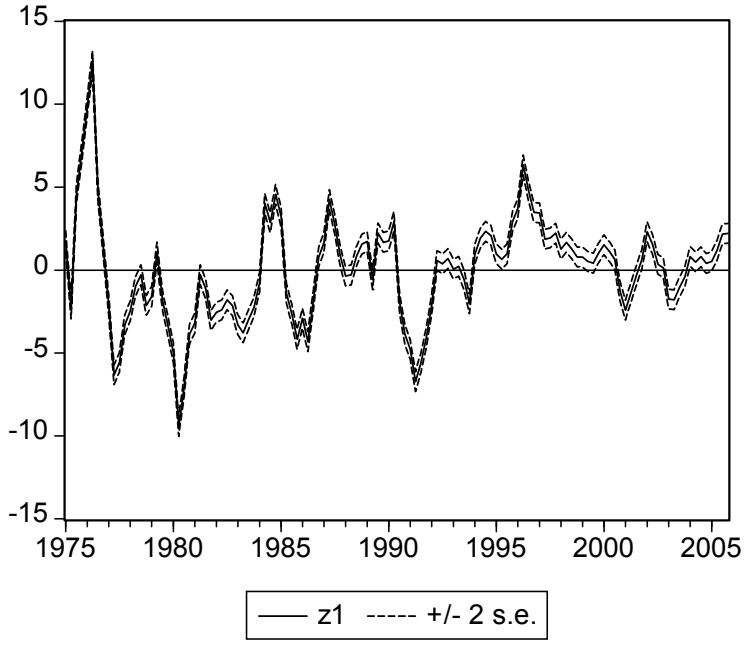
Denmark



wage indicator
realised nominal wage increases
wage policy norm: targeted inflation + increase in trend productivity

Figure 3-9: Time-varying wage-price shocks and exogenous price shocks in Sweden

Time-variant wage-price shocks:



Time-variant exogenous price shocks:

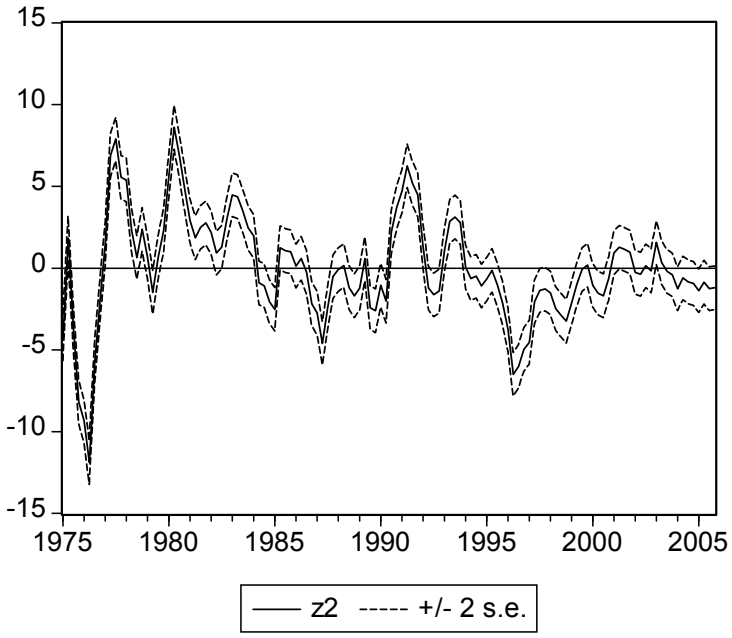
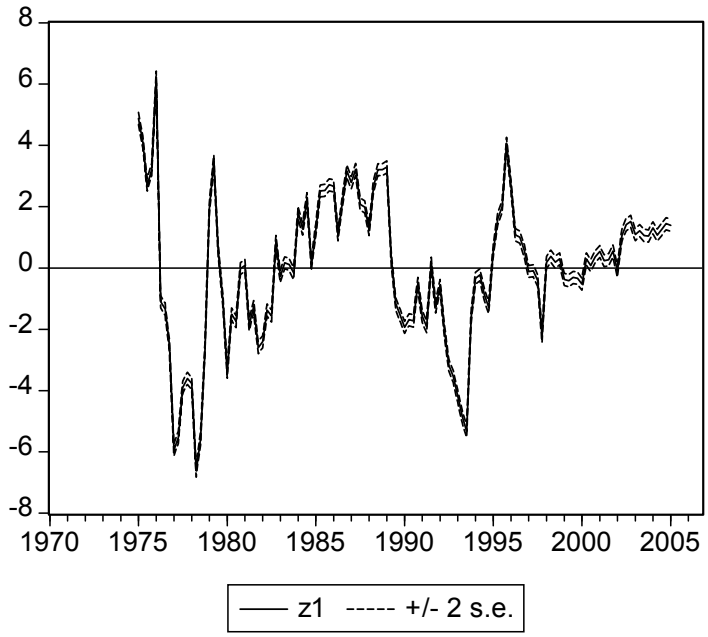


Figure 3-10: Time-varying wage-price shocks and exogenous price shocks in Finland

Time-variant wage-price shocks:



Time-variant exogenous price shocks:

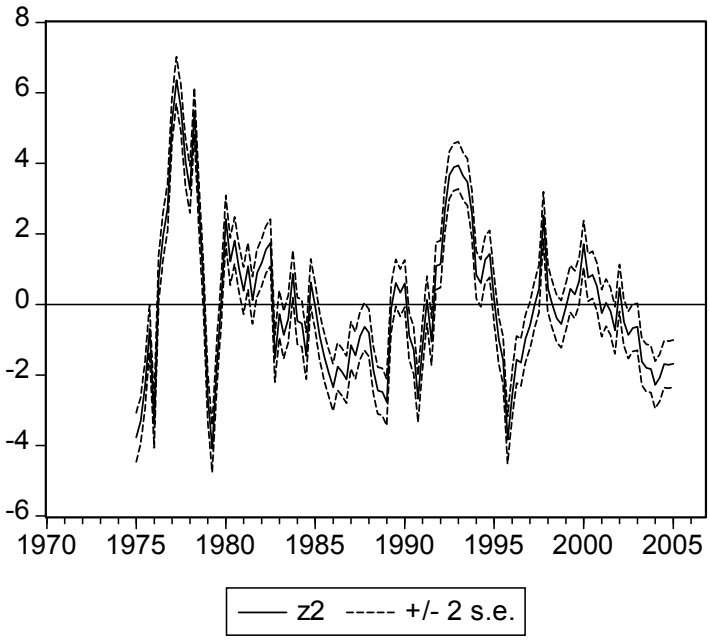
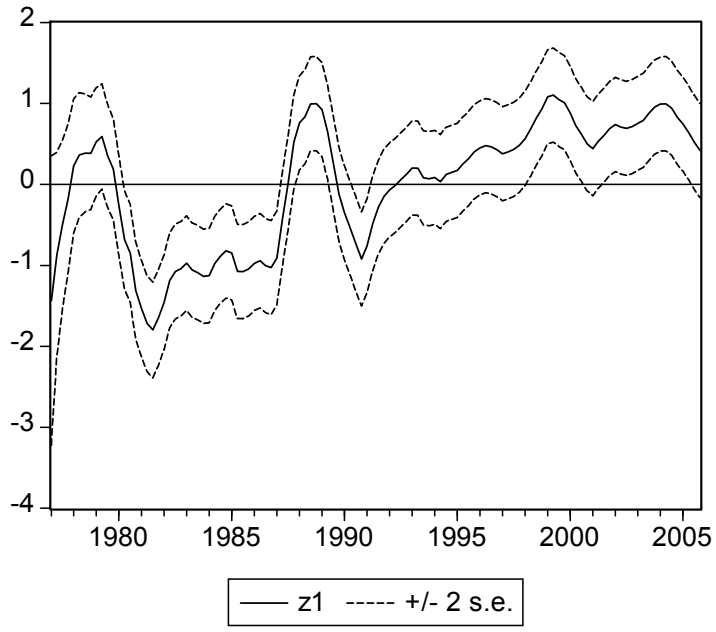


Figure 3-11: Time-varying wage-price shocks and exogenous price shocks in Denmark

Time-variant wage-price shocks:



Time-variant exogenous price shocks:

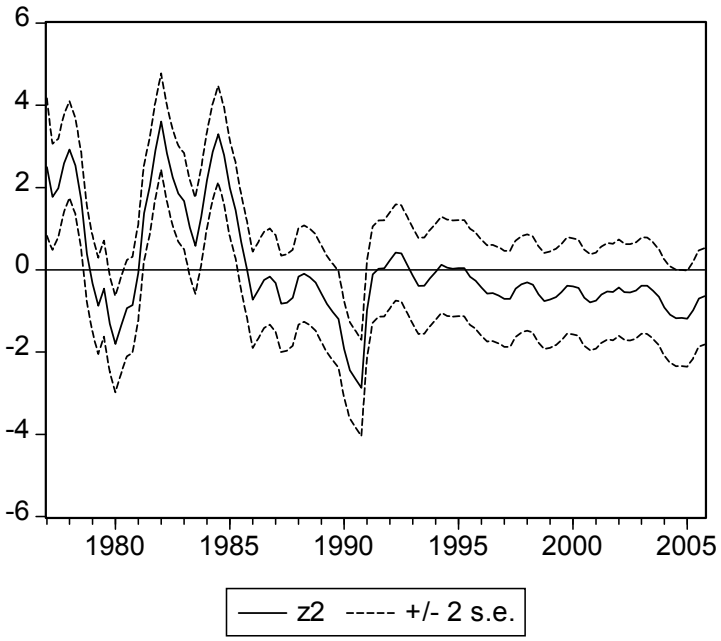


Figure 3-12: Variance decomposition of the VAR I for Macroeconomic Policy in Sweden 1976q2 – 1990q4

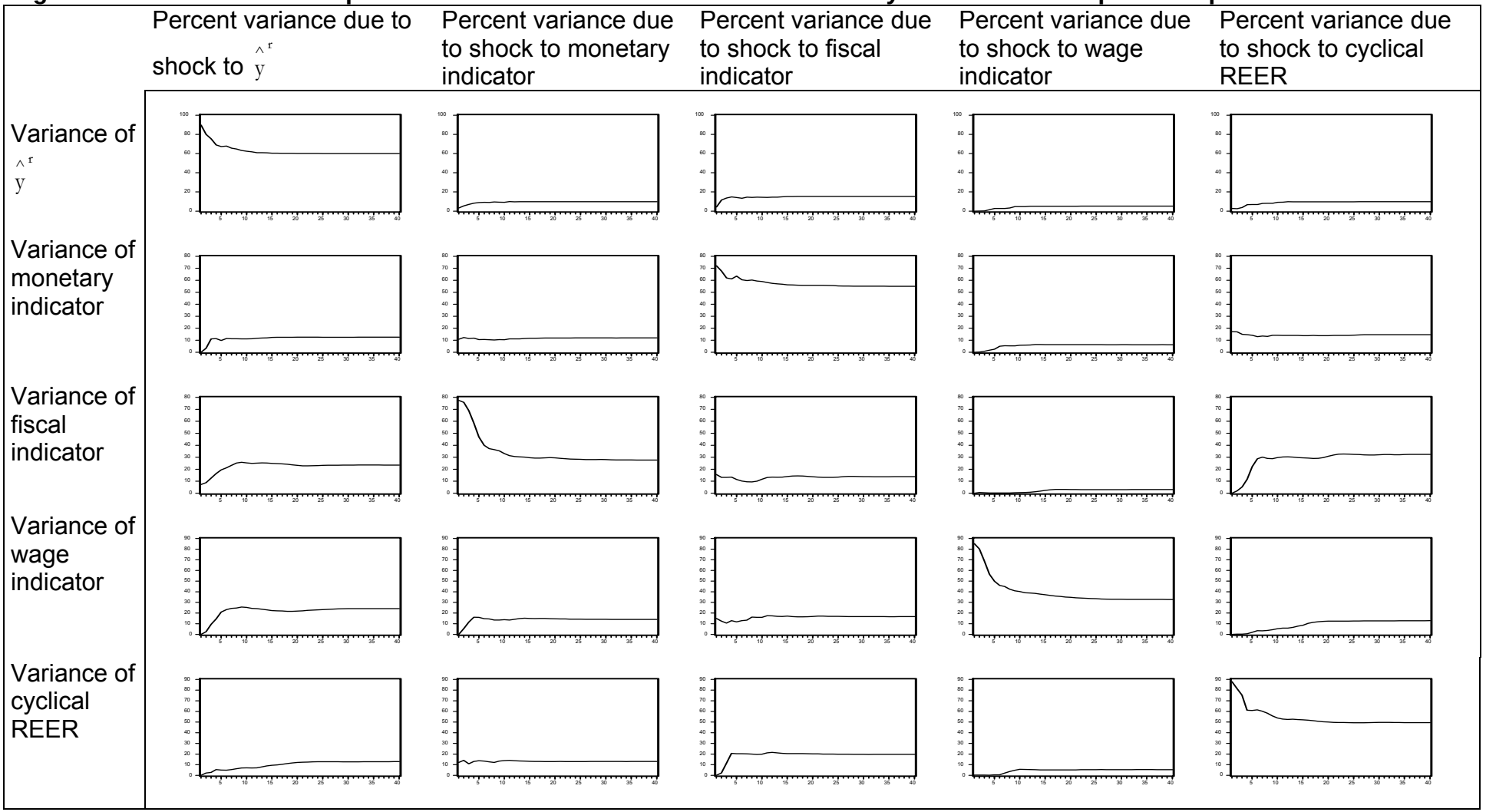


Figure 3-13: Variance decomposition of the VAR II for Macroeconomic Policy in Sweden 1991q1 – 2006q2

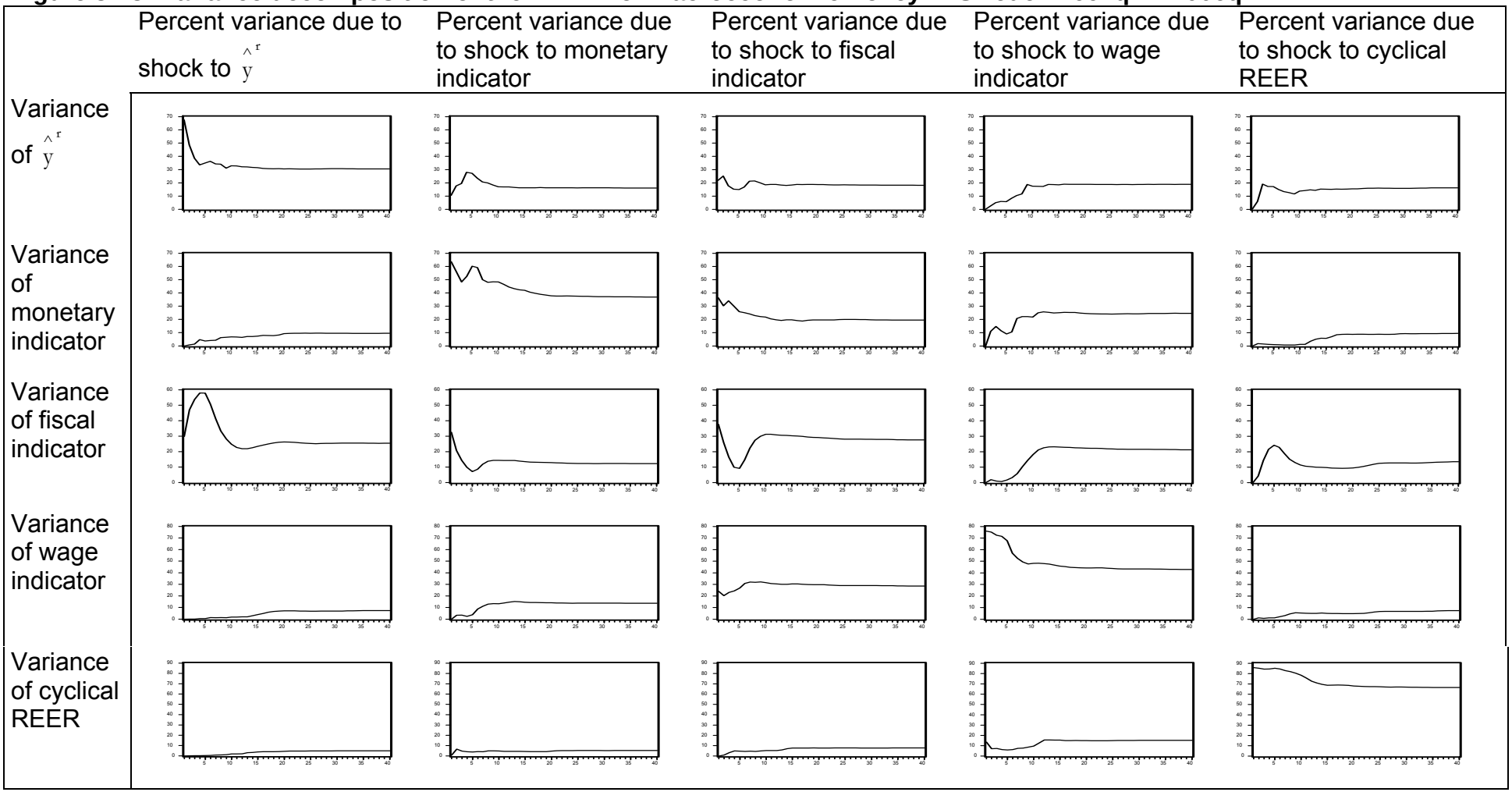


Figure 3-14: Variance decomposition of the VAR I for Macroeconomic Policy in Finland 1975q4 – 1986q4

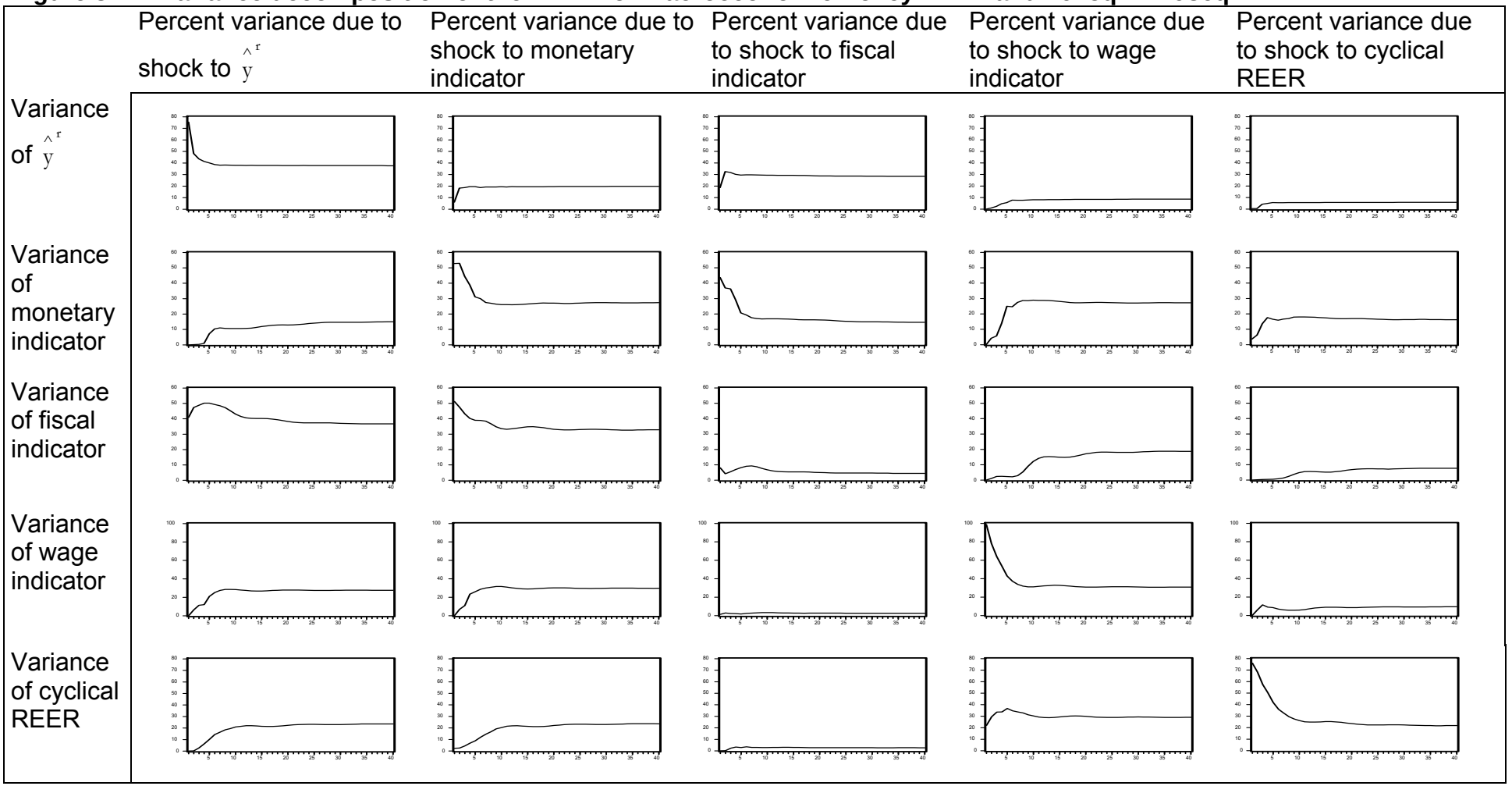


Figure 3-15: Variance decomposition of the VAR II for Macroeconomic Policy in Finland 1987q1 – 2005q1

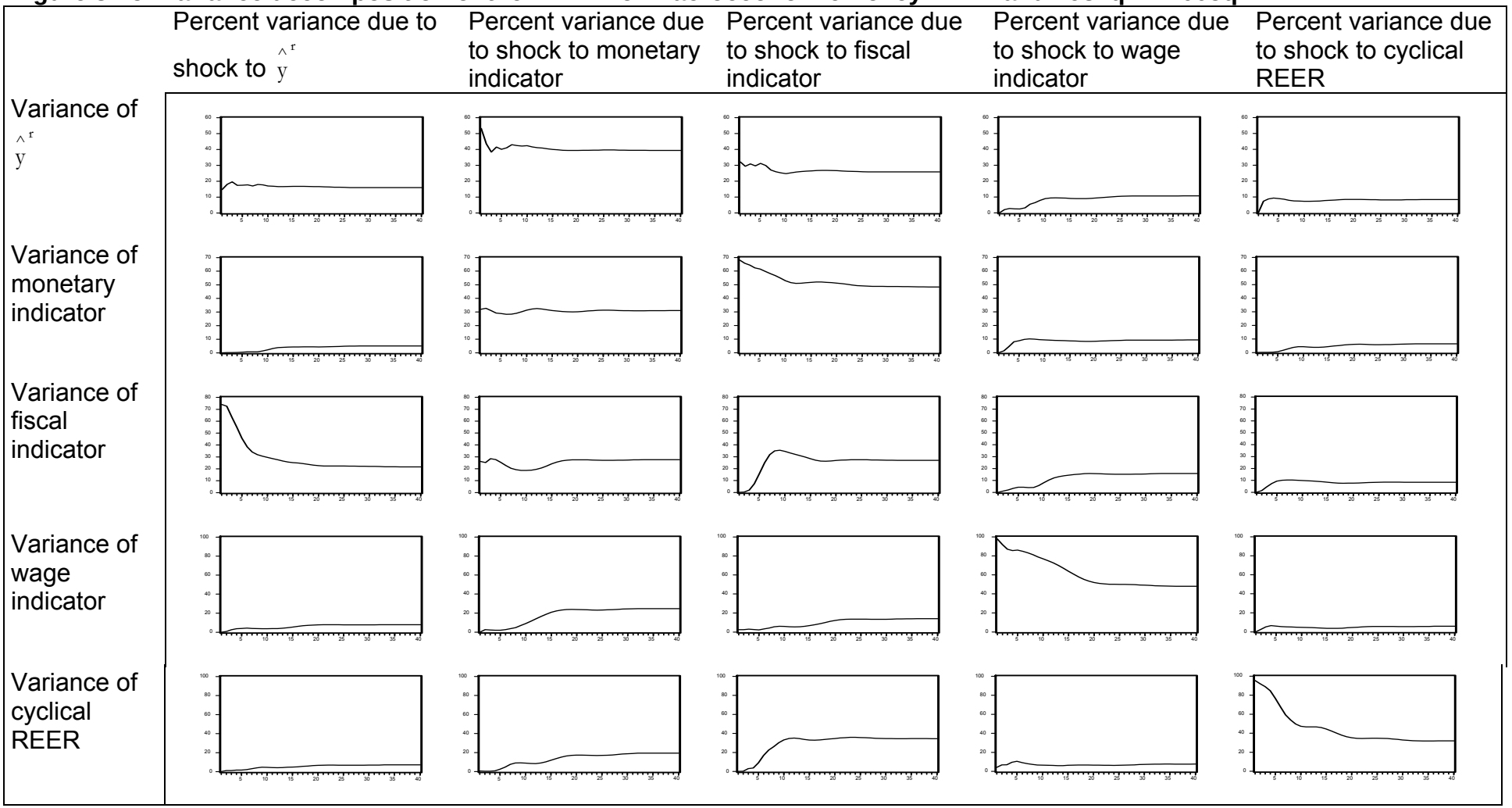


Figure 3-16: Variance decomposition of the VAR I for Macroeconomic Policy in Denmark 1982q1 – 2006q4

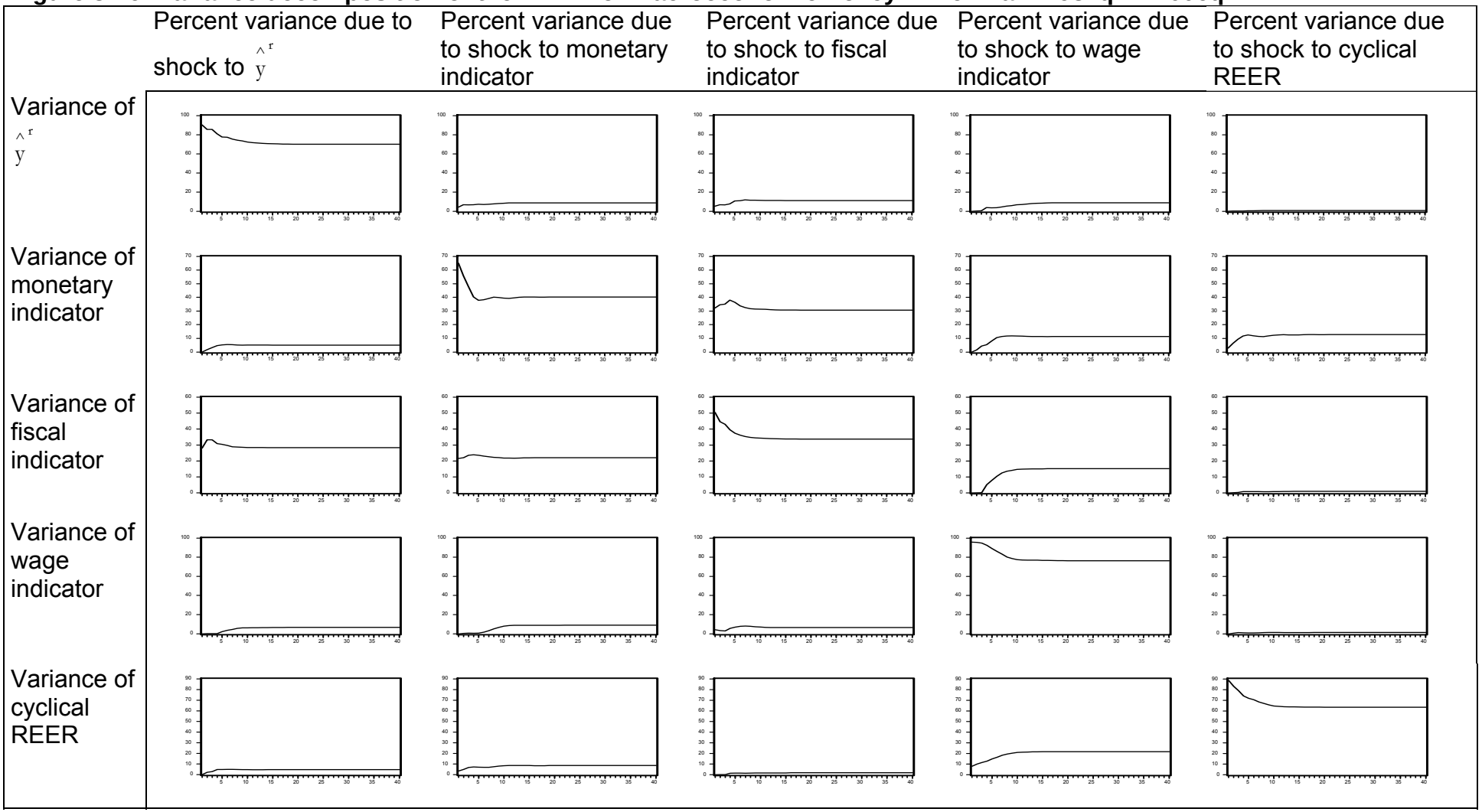


Table 3-1: Summary of the results of the VARs for Macroeconomic Policy in Scandinavia

	Sweden 1976-90	Sweden 1991-2006	Finland 1975-86	Finland 1987-2005	Denmark 1982-2006
Main influence of shock to $\hat{y}^r$ on	$\hat{y}^r$ (60%); fiscal indicator (30%); wage indicator (25%)	$\hat{y}^r$ (30%); fiscal indicator (25%)	$\hat{y}^r$ (40%)fiscal indicator (40%); wage indicator (30%); REER (20%)	$\hat{y}^r$ (20%); fiscal indicator (25%)	$\hat{y}^r$ (70%); fiscal indicator (30%)
Main influence of shock to monetary indicator on	Fiscal indicator (30%)	Monetary indicator (40%)	$\hat{y}^r$ (20%); monetary indicator (30%); fiscal indicator (25%); wage indicator (30%); REER (20%)	$\hat{y}^r$ (40%); monetary indicator (30%); fiscal indicator (30%); wage indicator (20%); REER (20%)	Monetary indicator (40%); fiscal indicator (20%)
Main influence of shock to fiscal indicator on	$\hat{y}^r$ (20%); monetary indicator (60%); wage indicator (20%); REER (20%)	$\hat{y}^r$ (20%); monetary indicator (20%); fiscal indicator (30%); wage indicator (30%)	$\hat{y}^r$ (30%)	$\hat{y}^r$ (25%); monetary indicator (50%); fiscal indicator (30%); REER (40%)	Monetary indicator (30%); fiscal indicator (35%);
Main influence of shock to wage indicator on	Wage indicator (40%)	$\hat{y}^r$ (20%); monetary indicator (25%); fiscal indicator (20%); wage indicator (45%); REER (20%)	Monetary indicator (30%); fiscal indicator (20%); wage indicator (30%); REER (30%)	Wage indicator (50%)	Wage indicator (80%); REER (20%)
Main influence of shock to cyclical REER on	Fiscal indicator (30%); REER (50%)	REER (70%)	Monetary indicator (20%); REER (25%)	REER (40%)	REER (65%)

4 Figures and Tables for Part 4

Table 4-1: The wage share as a proxy for the effect of income distribution on the growth trend

Time range	X-variables	B	R^2	DW-Statistic	N
1971-1975	gr_pop, inv	0.144*** (0.033)	0.672	2.136	22
	inv	0.162*** (0.039)	0.596	1.673	22
	gr_pop	0.155*** (0.037)	0.577	2.387	22
1976-1980	inv	0.049 (0.043)	0.498	2.213	22
	gr_pop	0.067 (0.050)	0.317	2.127	22
1981-1985	gr_pop, ex, im	0.145*** (0.051)	0.488	1.999	22
	gr_pop	0.062 (0.049)	0.296	2.236	22
1986-1990	cons, inv, ex, im	0.089 (0.062)	0.629	2.513	22
	ex, im	0.188** (0.073)	0.365	1.811	22
1991-1995	cons, inv, ex, im	0.040 (0.072)	0.500	2.295	22
	ex, im	0.154* (0.076)	0.186	1.494	22
	inv	-0.049 (0.076)	0.190	2.602	22
1996-2000	gr_pop, inv	-0.138** (0.053)	0.548	1.961	22
	inv	-0.183** (0.066)	0.276	2.200	22
2001-2005	gr_pop, ex	-0.046 (0.055)	0.388	1.688	22
	inv	-0.133** (0.057)	0.214	1.693	22

Notes: *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. Standard errors are in parentheses. X-variables are: population growth (gr_pop), investment (% of GDP, inv), private consumption (% of GDP, cons), exports (% of GDP, ex) and imports (% of GDP, im).

Table 4-2: The Gini coefficient as a proxy for the effect of income distribution on the growth trend

Time range	X-variables	β	R^2	DW-Statistic	N
1996-2000	ex	0.082** (0.037)	0.376	1.946	20
	ex, im	0.866** (0.041)	0.342	1.849	20
	cons	0.148** (0.059)	0.218	1.649	20
2001-2005	ex, inv	0.073 (0.044)	0.376	2.070	20
	ex	0.076 (0.047)	0.297	1.601	20
	cons	0.141* (0.078)	0.119	1.675	20

Notes: *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. Standard errors are in parentheses. X-variables are: population growth (gr_pop), investment (% of GDP, inv), private consumption (% of GDP, cons), exports (% of GDP, ex) and imports (% of GDP, im).

Table 4-3: The percentage of the population age 15+ that has attained secondary school as a proxy for the effect of human capital on the growth trend

Time range	X-variables	β	R^2	DW-Statistic	N
1971-1975	gr_pop	-0.034* (0.018)	0.321	2.112	25
	ex, im	-0.016 (0.022)	0.284	1.456	25
	cons, inv	-0.011 (0.022)	0.339	1.765	25
1976-1980	gr_pop, inv	0.006 (0.017)	0.566	2.086	25
	inv	-0.031* (0.018)	0.250	1.411	25
1981-1985	gr_pop, inv	0.019 (0.018)	0.321	2.241	25
	gr_pop	0.024 (0.019)	0.237	2.460	25
1986-1990	inv	0.002 (0.022)	0.153	2.173	25
1991-1995	inv	0.001 (0.022)	0.162	2.630	25
1996-2000	gr_pop, ex	0.026 (0.021)	0.380	2.139	25
	gr_pop	0.038 (0.023)	0.216	2.345	25

Notes: *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. Standard errors are in parentheses. X-variables are: population growth (gr_pop), investment (% of GDP, inv), private consumption (% of GDP, cons), exports (% of GDP, ex) and imports (% of GDP, im).

Table 4-4: The average schooling years of the population age 15+ as a proxy for the effect of human capital on the growth trend

Time range	X-variables	β	R^2	DW-Statistic	N
1971-1975	gr_pop, inv	-0.359*** (0.118)	0.479	2.300	25
	cons, inv	-0.208 (0.168)	0.377	1.692	25
	ex, im	-0.261 (0.156)	0.353	1.372	25
1976-1980	inv, im	-0.262** (0.122)	0.294	1.466	25
	gr_pop, inv	-0.080 (0.107)	0.575	2.187	25
1981-1985	gr_pop, inv	0.001 (0.118)	0.285	2.281	25
	gr_pop	0.018 (0.126)	0.186	2.428	25
1986-1990	ex, im, inv, initial_gdp	-0.277* (0.151)	0.287	2.057	25
1991-1995	Inv	0.036 (0.137)	0.165	2.612	25
	ex, inv	0.009 (0.134)	0.208	2.462	25
1996-2000	gr_pop, ex	0.098 (0.125)	0.356	1.956	25
	gr_pop	0.133 (0.142)	0.157	2.106	25

Notes: *** denotes statistical significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. Standard errors are in parentheses. X-variables are: population growth (gr_pop), initial GDP (average GDP of the preceding five years in PPP), investment (% of GDP, inv), private consumption (% of GDP, cons), exports (% of GDP, ex) and imports (% of GDP, im).

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